Attachment A: Flow Frequency Memo and Fact Sheets for 303(d) Waters

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060

SUBJECT: Flow Frequency Determination / 303(d) Status
Tyson Foods, Inc. – VA0004031

TO: Laura Galli

FROM: Jennifer Palmore, P.G.

DATE: January 28, 2014
REVISED: September 30, 2015

COPIES: File

The Tyson Foods, Inc. – Glen Allen facility discharges to an unnamed tributary of the Chickahominy River in Hanover County. The rivermiles are as follows:

Outfall 001: 2-XDD001.12
Outfall 002: 2-XDD000.95
Outfall 003: 2-XDD001.13

Flow frequencies have been requested for use in developing effluent limitations for the VPDES permit.

At the discharge points, the receiving stream is shown to be an intermittent stream on the USGS Glen Allen 7 ½' Quadrangle topographic map. The flow frequencies for intermittent tributaries are listed below:

Unnamed tributary at Outfalls 001, 002, and 003:

1Q30 = 0.0 MGD	High Flow 1Q10 = 0.0 MGD
1Q10 = 0.0 MGD	High Flow 7Q10 = 0.0 MGD
7Q10 = 0.0 MGD	High Flow 30Q10 = 0.0 MGD
30Q10 = 0.0 MGD	HM = 0.0 MGD
30Q5 = 0.0 MGD	

Due to its intermittent nature, the receiving stream is considered a Tier 1 water. Effluent data should be used to characterize the stream during low flow conditions.

During the 2012 305(b)/303(d) Integrated Water Quality Assessment Report, the tributary below Tyson is considered a Category 5D water ("The Water Quality Standard is not attained where TMDLs for a pollutant(s) have been developed but one or more pollutants are still causing impairment requiring additional TMDL development.") The applicable fact sheets are attached. The stream was considered impaired of the Aquatic Life Use due to ammonia and pH exceedances, impaired benthic community, and low dissolved oxygen. The Wildlife Use was impaired due to the ammonia exceedances. The Fish Consumption Use was considered fully supporting with observed effects due to a VDH fish advisory for kepone, and the Recreation Use was not assessed.

In the draft 2014 Integrated Report, the stream is also considered Category 5A. The stream was considered impaired of the Aquatic Life Use due to ammonia and pH exceedances and an impaired benthic community. The Wildlife Use was impaired due to the ammonia exceedances. The Fish Consumption Use was considered fully supporting with observed effects due to a VDH fish advisory for kepone. The Recreation Use was not assessed.

Tyson was addressed in the report “Total Maximum Daily Load (TMDL) Development for the Unnamed Tributary to the Chickahominy River” which was approved by the EPA on 8/5/2004 and by the SWCB on 3/15/2005. The facility received a total phosphorus wasteload allocation of 409.35 lbs/year.

The Chickahominy River and Tributaries Bacterial TMDL was approved by the EPA on 9/19/2012 and by the SWCB on 3/25/2013. Tyson received an E. coli wasteload allocation of 2.18E+12 cfu/year.

The discharge was also addressed in the Chesapeake Bay TMDL, which was approved by the EPA on 12/29/2010. The TMDL allocates loads for total nitrogen, total phosphorus, and total suspended solids to protect the dissolved oxygen and submerged aquatic vegetation acreage criteria in the Chesapeake Bay and its tidal tributaries. Tyson Foods is considered a significant nutrient discharger and was included in the aggregated loads for significant wastewater dischargers in the Chickahominy River estuary (CHKOH). The nutrient allocations are administered through the Watershed Nutrient General Permit; the TSS allocations are considered aggregated and facilities with technology-based TSS limits are considered to be in conformance with the TMDL.

If you have any questions concerning this analysis, please let me know.

2014 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: **Chickahominy River, UT - Unnamed Tributary**

TMDL ID: **G05R-01-BEN** **2014 IMPAIRED AREA ID:** VAP-G05R-01

ASSESSMENT CATEGORY: 4A **TMDL DUE DATE:** 2004

IMPAIRED SIZE: 1.17 - Miles **Watershed:** VAP-G05R

INITIAL LISTING: 1994

UPSTREAM LIMIT: Tyson Plant discharge

DOWNSTREAM LIMIT: Chickahominy River confluence

Segment consists of the unnamed tributary of the Chickahominy River to which the Tyson Plant discharges.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting

IMPAIRMENT: General Standard (Benthic), pH

Biological monitoring of the receiving stream identified a moderately impaired benthic community downstream of the Tyson Plant (VPDES Permit No. VA0004031) discharge when compared to the benthic community immediately upstream of the discharge. This resulted in this segment being assessed as impaired of the Clean Water Act's Aquatic Life Use Support Goal for the 1994 305(b) report. Continued monitoring resulted in a similar assessment for the 1996, 1998, 2002, and 2004 reports.

The TMDL study for the watershed was completed during the 2006 cycle. Extensive biological and nutrient monitoring was conducted. The benthic impairment continued and a pH impairment was noted at stations 2-XDD000.32 and 2-XDD000.40. The past phosphorus screening value was exceeded at multiple stations. The past chlorophyll A screening value was exceeded at 2-XDD000.40 and 2-XDD000.32 as well.

The TMDL was approved by the EPA on 8/05/2004 and by the SWCB on 3/15/05. The study attributed the benthic impairment to excess phosphorus and high pH. The allocation was 432.69 lbs/year of phosphorus, divided between Tysons Foods (409.35 lbs/yr) and nonpoint sources (23.34 lbs/year).

The segment remained impaired for benthics as well as pH during the 2014 cycle with an exceedance rate of 26/65 at 2-XDD000.40. and 31/64 at 2-XDD000.32.

IMPAIRMENT SOURCE Industrial Point Source, Nonpoint Source

The source of the impairment was attributed to excessive nutrient overenrichment.

RECOMMENDATION: Implementation

2014 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: **Chickahominy River, UT - Unnamed Tributary**

TMDL ID: **G05R-01-NH3** **2014 IMPAIRED AREA ID:** VAP-G05R-01

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2020

IMPAIRED SIZE: 1.17 - Miles **Watershed:** VAP-G05R

INITIAL LISTING: 2008

UPSTREAM LIMIT: Tyson Plant discharge

DOWNSTREAM LIMIT: Chickahominy River confluence

Segment consists of the unnamed tributary of the Chickahominy River to which the Tyson Plant discharges.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting, Wildlife Use - Not Supporting

IMPAIRMENT: Ammonia

Multiple exceedances of the chronic ammonia criteria had been noted in grab samples throughout the stream, therefore a special study was conducted in July 2005 to investigate the ammonia levels in the stream. Based on the results of the study, the segment was impaired for ammonia because of 6 acute ammonia exceedances each at 2-XDD000.84 and at 2-XDD000.91. A fish kill was noted in the pond.

Although there were no acute ammonia exceedances in the 2014 cycle, there were multiple chronic exceedances at 2-XDD000.32, 2-XDD000.40, 2-XDD000.84, and 2-XDD000.91. The impairment will be carried over this cycle, but continued monitoring is recommended.

IMPAIRMENT SOURCE Industrial Point Source

The source of the impairment is believed to be the Tysons Plant discharge.

RECOMMENDATION: Continue monitoring

2012 Fact Sheets for 303(d) Waters

RIVER BASIN: James River Basin **HYDROLOGIC UNIT:** 02080206

STREAM NAME: **Chickahominy River, UT - Unnamed Tributary**

TMDL ID: **G05R-01-DO** **2012 IMPAIRED AREA ID:** VAP-G05R-01

ASSESSMENT CATEGORY: 5A **TMDL DUE DATE:** 2020

IMPAIRED SIZE: 1.15 - Miles **Watershed:** VAP-G05R

INITIAL LISTING: 2008

UPSTREAM LIMIT: Tyson Plant discharge

DOWNSTREAM LIMIT: Chickahominy River confluence

Segment consists of the unnamed tributary of the Chickahominy River to which the Tyson Plant discharges.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Aquatic Life Use - Not Supporting

IMPAIRMENT: Dissolved Oxygen

The segment was assessed as not supporting of the Aquatic Life Use for dissolved oxygen due to an exceedance rate of 2/2 at 2-XDD000.65. Other stations in the segment have acceptable violation rates, therefore continued monitoring is recommended.

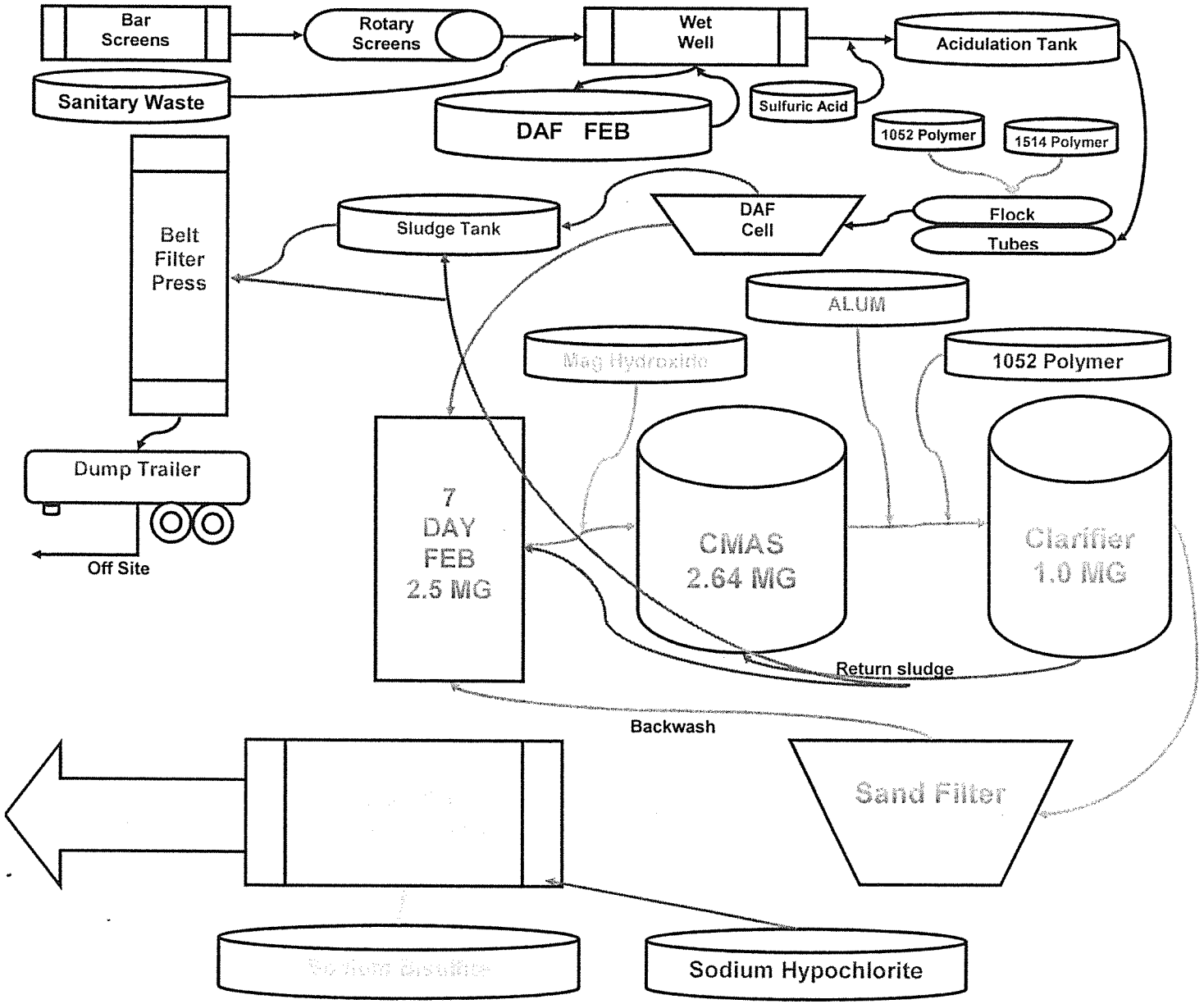
IMPAIRMENT SOURCE: Industrial Point Source

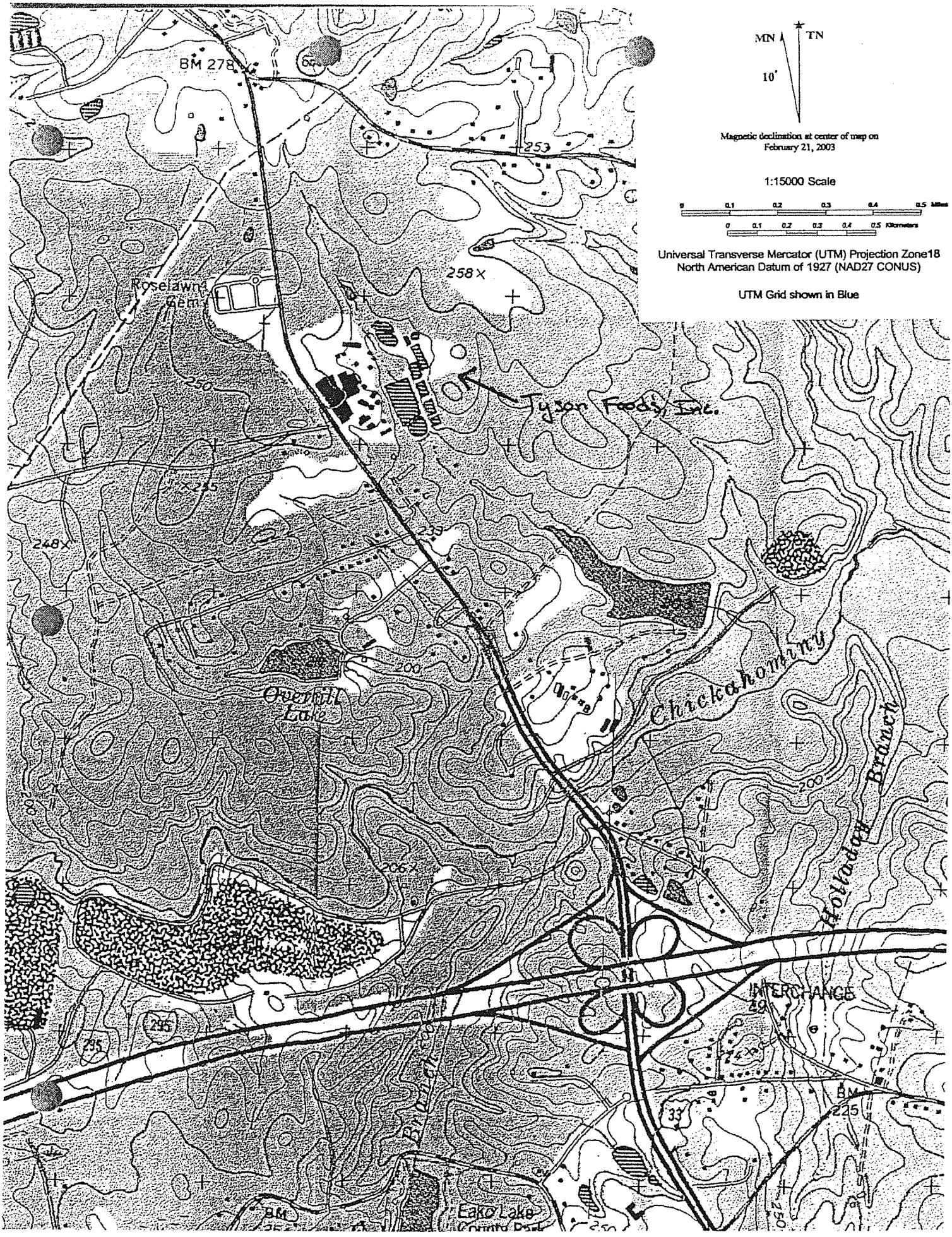
The source of the impairment is believed to be the Tysons Plant discharge.

RECOMMENDATION: Continue Monitoring

Attachment B: Site Diagram and Location Map

WWTP Process Flow




MN
TN
10°
Magnetic declination at center of map on February 21, 2003
1:15000 Scale
Universal Transverse Mercator (UTM) Projection Zone18
North American Datum of 1927 (NAD27 CONUS)
UTM Grid shown in Blue
BM 278
253
258
Roselawn Cem.
250
Tyson Foods, Inc.
235
248
200
Overhill Lake
Chickahominy
Holladay Branch
206
INTERCHANGE
295
BM
225
Eako Lake

Attachment C: Site Inspection Report

Wastewater Facility Inspection Report
Virginia Department of Environmental Quality

TECHNICAL INSPECTION REPORT

FACILITY NAME: Tyson Foods, Inc.		**INSPECTION DATE:**	August 30, 2013
		INSPECTOR	Shawn Weimer
PERMIT No.: VA0004031		**REPORT DATE:**	October 3, 2013
TYPE OF FACILITY: ☐ Municipal ☐ Major ☑ Industrial ☑ Minor ☐ Federal ☐ Small Minor ☐ HP ☐ LP		**TIME OF INSPECTION:**	0913 Arrival / 1330 Departure
		TOTAL TIME SPENT (including prep & travel)	28 hours
PHOTOGRAPHS: ☑ Yes ☐ No		**UNANNOUNCED INSPECTION?**	☐ Yes ☑ No
REVIEWED BY / Date:			
PRESENT DURING INSPECTION: Austin French and Tim Lockhart			

TECHNICAL INSPECTION

1. Has there been any new construction? • If so, were plans and specifications approved? Comments: **Upgrade from a single stage activated sludge treatment system to a four stage Bardenpho BNR process along with the addition of a UV disinfection system.**	☑ Yes ☐ No
2. Is the Operations and Maintenance Manual approved and up-to-date? Comments: **An O&M manual dated August 7, 2012 was reviewed as part of this inspection.**	☑ Yes ☐ No
3. Are the Permit and/or Operation and Maintenance Manual specified licensed operator being met? Comments: **1 class I operator; three employees are working on obtaining their class IV license.**	☑ Yes ☐ No
4. Are the Permit and/or Operation and Maintenance Manual specified operator staffing requirements being met? Comments:	☑ Yes ☐ No
5. Is there an established and adequate program for training personnel? Comments: **Training includes: DEQ's operator training books, Sacramento operator training books, and licensing prep classes at John Tyler CC.**	☑ Yes ☐ No
6. Are preventive maintenance task schedules being met? Comments: **Minor maintenance is performed by plant personnel and more complex repairs (e.g. rebuilding a pump) are performed by contractors.**	☑ Yes ☐ No
7. Does the plant experience any organic or hydraulic overloading? Comments:	☐ Yes ☑ No
8. Have there been any bypassing or overflows since the last inspection? Comments: **On August 10, 2012, the facility received heavy rainfall which caused an overflow in their sanitary wet well. An estimated 300 to 500 gallons was reported to have reached the wastewater effluent creek which discharges into a UT of the Chickahominy River. After investigating the incident, weekend pump settings were modified so that flows in the wet wells could be properly controlled during incidents of heavy rainfall.**	☑ Yes ☐ No

9. Is the standby generator (including power transfer switch) operational and exercised regularly? Comments:	☑ Yes ☐ No
10. Is the plant alarm system operational and tested regularly? Comments:	☑ Yes ☐ No
11. Is sludge disposed of in accordance with the approved sludge management plan? Comments: **Sludge from the belt press is transported to an off-site composting facility.**	☑ Yes ☐ No
12. Is septage received? • If so, is septage loading controlled, and are appropriate records maintained? Comments:	☐ Yes ☑ No
13. Are all plant records (operational logs, equipment maintenance, industrial waste contributors, sampling and testing) available for review and are records adequate? Comments:	☑ Yes ☐ No

14. Which of the following records does the plant maintain?

☑ Operational logs ☑ Instrument maintenance & calibration

☑ Mechanical equipment maintenance ☐ Industrial Waste Contribution (Municipal facilities)

Comments:

15. What does the operational log contain?

☑ Visual observations ☑ Flow Measurement ☑ Laboratory results ☑ Process adjustments

☑ Control calculations ☐ Other (specify)

Comments:

16. What do the mechanical equipment records contain?

☑ As built plans and specs ☑ Manufacturers instructions ☑ Lubrication schedules

☑ Spare parts inventory ☑ Equipment/parts suppliers

☐ Other (specify)

Comments:

17. What do the industrial waste contribution records contain (Municipal only)?

☐ Waste characteristics ☐ Impact on plant ☐ Locations and discharge types

☐ Other (specify)

Comments: **Not Applicable**

18. Which of the following records are kept at the plant and available to personnel?

☑ Equipment maintenance records ☑ Operational log ☐ Industrial contributor records

☑ Instrumentation records ☑ Sampling and testing records

Comments:

19. List records not normally available to plant personnel and their location:

Comments: **None**

20. Are the records maintained for the required time period (three or five years)? Comments:	☑ Yes ☐ No

Wastewater Facility Inspection Report

Permit # VA0004031

UNIT PROCESS EVALUATION SUMMARY SHEET

UNIT PROCESS	APPLICABLE	PROBLEMS*	COMMENTS
Sewage Pumping	X		
Flow Measurement (Influent)	X		
Screening/Comminution	X		
Grit Removal			
Oil Skimmer			
Flow Equalization	X		*Anoxic Reactor #1 (7-Day FEB)*
Ponds/Lagoons	X		*Out of service*
Imhoff Tank			
Primary Sedimentation			
Trickling Filter			
Septic Tank and Sand Filter			
Rotating Biological Contactor			
Activated Sludge Aeration	X		*Four stage Bardenpho BNR process with CMAS*
Biological Nutrient Removal			
Sequencing Batch Reactor			
Secondary Sedimentation	X	1,3	*Repairs to the clarifier were not completed as of October 2, 2013.*
Flocculation			
Tertiary Sedimentation			
Filtration	X		*Sand filters*
Micro-Screening			
Activated Carbon Adsorption			
Chlorination			
Dechlorination			
Ozonation			
Ultraviolet Disinfection	X		
Post Aeration	X		
Flow Measurement (Effluent)	X		
Land Application (Effluent)			
Plant Outfall	X		
Sludge Pumping	X		
Flotation Thickening (DAF)	X		
Gravity Belt Thickening			
Aerobic Digestion			
Anaerobic Digestion			
Lime Stabilization			
Centrifugation			
Sludge Press	X	1	*Belt press was not operational due to mechanical problems*
Vacuum Filtration			
Drying Beds			
Thermal Treatment			
Incineration			
Composting			
Land Application (Sludge)			

* Problem Codes

1. Unit Needs Attention
2. Abnormal Influent/Effluent
3. Evidence of Equipment Failure
4. Unapproved Modification or Temporary Repair
5. Evidence of Process Upset
6. Other (explain in comments)

Wastewater Facility Inspection Report

Permit # VA0004031

UNIT PROCESS: Screening/Comminution

1.	Number of units:	Manual: ***0***		Mechanical: ***4***
	Number of units in operation:	Manual: ***0***		Mechanical: ***4***
2.	Bypass channel provided?	[ ] Yes	[x] No	
	Bypass channel in use?	[ ] Yes	[ ] No	[x] N/A
3.	Area adequately ventilated?	[x] Yes	[ ] No	
4.	Alarm system for equipment failure or overloads?	[ ] Yes	[x] No	[ ] N/A
	If present, is the alarm system operational?	[ ] Yes	[ ] No	[x] N/A
5.	Proper flow-distribution between units?	[ ] Yes	[ ] No	[x] N/A
6.	How often are units checked and cleaned?	***The self-cleaning rotary units are checked daily***		
7.	Cycle of operation:	***Continuous***		
8.	Volume of screenings removed:	***Approximately 2 to 4 trailers daily***		
9.	General condition:	[x] Good	[ ] Fair	[ ] Poor

Comments: These units are located inside the processing plant (Offal Room) and precede the Influent Pump Station. An auger conveys screenings to waiting trailers; materials are hauled to a rendering facility.

UNIT PROCESS: Sewage Pumping

1. Name of station: ***Process Wastewater Influent Pump Station – Wet Well Nos. 1 and 2***
2. Location (if not at STP): ***N/A***
3. Following equipment operable:

a. All pumps?	[x] Yes	[ ] No	
b. Ventilation?	[x] Yes	[ ] No	[ ] N/A
c. Control system?	[x] Yes	[ ] No	[ ] N/A
d. Sump pump?	[ ] Yes	[ ] No	[x] N/A
e. Seal water system?	[ ] Yes	[ ] No	[x] N/A

4. Reliability considerations:

a. Class	N/A Industrial Wastewater Pump Station		
b. Alarm system operable?	[x] Yes	[ ] No	[ ] N/A
c. Alarm conditions monitored:			
1. high water level:	[x] Yes	[ ] No	[ ] N/A
2. high liquid level in dry well:	[ ] Yes	[ ] No	[x] N/A
3. main electric power:	[ ] Yes	[x] No	[ ] N/A
4. auxiliary electric power:	[ ] Yes	[x] No	[ ] N/A
5. failure of pump motors to start:	[ ] Yes	[x] No	[ ] N/A
6. test function:	[ ] Yes	[x] No	
7. other:			
d. Backup for alarm system operational?	[ ] Yes	[ ] No	[x] N/A
e. Alarm signal reported to (identify):	***local audio and visual, lab building***		
f. Continuous operability provisions:			
1. Generator hook up?	[x] Yes	[ ] No	***standby generator***
2. Two sources of electricity?	[ ] Yes	[x] No	
3. Portable pump?	[ ] Yes	[x] No	
4. 1 day storage?	[ ] Yes	[x] No	
5. other:			

5. Does station have bypass?	[ ] Yes	[x] No	
a. Evidence of bypass use?	[ ] Yes	[ ] No	[x] N/A
b. Can bypass be disinfected?	[ ] Yes	[ ] No*	[x] N/A
c. Can bypass be measured?	[ ] Yes	[ ] No*	[x] N/A

6. How often is station checked? ***every 2 hours***
7. General condition: [x] Good [ ] Fair [ ] Poor

Comments: The station receives screened process wastewater and storm water runoff (Offal loading area) and pumps to the pretreatment facilities. The station is subdivided – Wet Well #1 and Wet Well #2. Wet Well #1 is an open tank equipped with 2 pumps, two mechanical mixers, and an overflow portal to Wet Well #2. Wet Well # 2 is a covered tank also equipped with 2 pumps. All four centrifugal pumps and alarm systems are activated by sonic level detectors. Pumps #1 and #2 pump from Wet Well #1 and pumps #3 and #4 pump from Wet Well #2.

After screening, all wastewater flow enters Wet Well #1. From there it is pumped to the pre-DAF Acidulation Tank. Overflows from Wet Well #1 go to Wet Well #2. Excessive flows to Wet Well #1 may be diverted to the DAF FEB to achieve equalized flow through the DAF unit. The contents of the DAF FEB gravity flow back to Wet Well #1. DAF effluent flows by gravity to Anoxic Reactor #1 (7-Day FEB).

Wastewater Facility Inspection Report

Permit # VA0004031

UNIT PROCESS: Flow Equalization

"DAF FEB"

1. Type of unit: [ ] In-line [x] Side-line [ ] Spill Pond
   Number of cells: ***1***
   Number of cells in operation: ***1***
2. What unit process does it precede? ***Wet Well #1***
3. Is volume adequate? [x] Yes [ ] No
4. Type of mixing: [ ] None [x] Diffused air [ ] Fixed Mechanical [ ] Floating mechanical
5. Condition of mixing equipment: [x] Good [ ] Average [ ] Poor
6. How drawn off?
   a. Pumped from: ***Gravity flow from the bottom*** [ ] Surface [ ] Sub-surface [ ] Adjustable [x] N/A
   b. Weir: [ ] Surface [ ] Sub-surface [x] N/A
7. What is the condition of the containment structure? [x] Good [ ] Fair [ ] Poor
8. Are the facilities to flush solids and grease from basin walls adequate? [x] Yes [ ] No [ ] N/A
9. Are there facilities for withdrawing floating material and foam? [ ] Yes [x] No
10. How are solids removed? [x] Drain down [ ] Drag line [ ] Other:
    Is it adequate? [x] Yes [ ] No
11. Is the emergency overflow in good condition? [ ] Yes [ ] No [x] N/A
12. Are the depth gauges in good condition? [ ] Yes [ ] No [x] N/A
13. General condition: [x] Good [ ] Fair [ ] Poor

Comments: Wastewater flows by gravity, from the bottom, back to Wet Well #1.

UNIT PROCESS: Floatation Thickening

(Dissolved Air Floatation – DAF)

1. Number of units: *1*
   Number of units in operation: *1*
2. Floatation-aid system provided? [x] Yes [ ] No
   Type of aid/dosage: ***Cationic (7 ppm) and anionic polymers (4ppm)***
3. Sludge pumping: [ ] Manual [x] Automatic
4. Skimmer blade removal system operating properly? [x] Yes [ ] No
5. Sludge collection system operating properly? [x] Yes [ ] No
6. Effluent baffle system working properly? [x] Yes [ ] No
7. Is the unit used to thicken sludges other than WAS? [x] Yes [ ] No
   If not specify other sludge(s): ***unit used to remove grease and floatables prior to biological stabilization and sedimentation***
8. Signs of overloading? [ ] Yes [x] No
9. Process control testing:
   a. Feed solids testing: [ ] Yes [x] No _____%
   b. Thickened sludge solids testing: [ ] Yes [x] No _____%
   c. Underflow testing: [ ] Yes [x] No _____
   d. pH: [x] Yes [ ] No ***continuous online***
10. Percent capture of solids: ***not measured***
11. General condition: [ ] Good [x] Fair [ ] Poor

Comments: Wastewater is pumped from Wet Well #1 to the acidulation tank where sulfuric acid is added to bring the pH to between 4.7 and 5.2 S.U. The acidulated wastewater enters flocculation tubes where cationic and anionic polymers are injected. The flocculated wastewater then enters the Dissolved Air Floatation (DAF) unit. Sulfuric acid is stored in a secondary contained tank which is outside and adjacent to the DAF building. Polymers are stored in the DAF building. Heavy particles settle down and are collected in the sludge cone and the floating floc is skimmed off of the top. Captured solids are transported to a rendering facility.

Wastewater Facility Inspection Report

Permit # VA0004031

UNIT PROCESS: Sewage Pumping

1.	Name of station:	***Domestic Wastewater (Wet Well No. 3) Pump Station***		
2.	Location (if not at STP):	***N/A***		
3.	Following equipment operable:			
	a. All pumps?	[x] Yes	[ ] No	
	b. Ventilation?	[x] Yes	[ ] No	[ ] N/A
	c. Control system?	[x] Yes	[ ] No	[ ] N/A
	d. Sump pump?	[ ] Yes	[ ] No	[x] N/A
	e. Seal water system?	[ ] Yes	[ ] No	[x] N/A
4.	Reliability considerations:			
	a. Class	[x] I	[ ] II	[ ] III
	b. Alarm system operable?	[x] Yes	[ ] No	[ ] N/A
	c. Alarm conditions monitored:			
	1. high water level:	[x] Yes	[ ] No	[ ] N/A
	2. high liquid level in dry well:	[ ] Yes	[ ] No	[x] N/A
	3. main electric power:	[ ] Yes	[x] No	[ ] N/A
	4. auxiliary electric power:	[ ] Yes	[x] No	[ ] N/A
	5. failure of pump motors to start:	[ ] Yes	[x] No	[ ] N/A
	6. test function:	[ ] Yes	[x] No	
	7. other:	N/A		
	d. Backup for alarm system operational?	[ ] Yes	[ ] No	[x] N/A
	e. Alarm signal reported to (identify):	***Lab building***		
	f. Continuous operability provisions:			
	1. Generator hook up?	[x] Yes	[ ] No	***standby generator***
	2. Two sources of electricity?	[ ] Yes	[x] No	
	3. Portable pump?	[ ] Yes	[x] No	
	4. 1 day storage?	[ ] Yes	[x] No	
	5. other:			
5.	Does station have bypass?	[ ] Yes	[x] No	
	a. Evidence of bypass use?	[ ] Yes	[ ] No	[x] N/A
	b. Can bypass be disinfected?	[ ] Yes	[ ] No	[x] N/A
	c. Can bypass be measured?	[ ] Yes	[ ] No	[x] N/A
6.	How often is station checked?	***Every 2 hours***		
7.	General condition:	[x] Good	[ ] Fair	[ ] Poor

Comments: This station receives domestic wastewater from the plant and surface runoff from the chicken off-loading area. Raw sewage pump #5 and #6 pump wastewater from Wet Well #3 to the 7-Day FEB.

UNIT PROCESS: Anoxic Reactor #1 (7-Day FEB)

1.	Type of unit:	[x] In-line [ ] Side-line [ ] Spill Pond
	Number of cells:	*1*
	Number of cells in operation:	*1*
2.	What unit process does it precede?	***CMAS (complete mix activated sludge unit)***
3.	Is volume adequate?	[x] Yes [ ] No
4.	Type of mixing:	[ ] None [x] Diffused air [ ] Fixed Mechanical [ ] Floating mechanical
5.	Condition of mixing equipment:	[ ] Good [x] Average [ ] Poor
6.	How drawn off?	
	a. Pumped from:	[ ] Surface [x] Sub-surface [ ] Adjustable [ ] N/A
	b. Weir:	[ ] Surface [ ] Sub-surface [x] N/A
7.	What is the condition of the containment structure?	[x] Good [ ] Fair [ ] Poor
8.	Are the facilities to flush solids and grease from basin walls adequate?	[x] Yes [ ] No [ ] N/A
9.	Are there facilities for withdrawing floating material and foam?	[ ] Yes [x] No
10.	How are solids removed?	[x] Drain down [ ] Drag line [ ] Other:
	Is it adequate?	[x] Yes [ ] No
11.	Is the emergency overflow in good condition?	[ ] Yes [ ] No [x] N/A
12.	Are the depth gauges in good condition?	[x] Yes [ ] No [ ] N/A
13.	General condition:	[x] Good [ ] Fair [ ] Poor

Comments: The 7-Day FEB was retrofitted into an anoxic reactor as part of the upgrade to the four stage Bardenpho biological nutrient removal (BNR) process. Mixing in the reactor is provided by 10, 7.5 HP floating mixers. For aeration, subsurface diffuser laterals are located on the bottom of the basin. It was noted that these diffusers are only turned on for one hour each night to exercise the blower and prevent the diffusers from filling up with water. The processing plant generally operates only 5 days per week, so the level in the basin increases during the week, and is drawn down on the weekend. In turn, the waste load at the WWTP is a little lighter on Monday after the weekend, and is heavier by the end of the week. Some accumulation of solids beneath the water surface along the perimeter of the basin was visible. Mr. French noted that solids slowly accumulate where the influence of the mixtures does not reach; solids that accumulate are periodically removed by a contractor. A magnetic flow meter measures flow from the reactor basin. A high liquid-level condition will alarm in the lab building. The 7-Day FEB receives flow from the DAF, Return Activated Sludge (RAS) from the clarifier, nitrate recycle from the Complete Mix Activated Sludge (CMAS) unit, domestic wastewater from the plant, and backwash water from the sand filters.

At the time of the inspection, the 7-Day FEB was receiving RAS at a rate of 1200 gallons per minute. The nitrate recycle from the CMAS back to the 7-Day FEB was 2500 gallons per minute.

Wastewater Facility Inspection Report

Permit # VA0004031

UNIT PROCESS: Activated Sludge Aeration (Aerobic Reactor #2)

1. Number of units: ***1 Complete Mix Activated Sludge Unit (CMAS)***
   Number of units in operation: ***1***
2. Mode of operation: ***BNR***
3. Proper flow distribution between units? [ ] Yes [ ] No [x] N/A
4. Foam control operational? [ ] Yes [ ] No [x] N/A
5. Scum control operational? [ ] Yes [ ] No [x] N/A
6. Evidence of the following problems:
   a. Dead spots? [ ] Yes [x] No
   b. Excessive foam? [ ] Yes [x] No
   c. Poor aeration? [ ] Yes [x] No
   d. Excessive aeration? [ ] Yes [x] No
   e. Excessive scum? [ ] Yes [x] No
   f. Aeration equipment malfunction? [ ] Yes [x] No
   g. Other:
7. Mixed liquor characteristics (as available) ***As described on the bench sheet for August 29, 2013 at 1200***

pH:	***6.89 SU***	MLSS:	***5620 mg/L***
DO:	***2.41 mg/L***	SDI:	***not obtained***
SVI:	***not obtained***	Color:	***Medium Brown***
Odor:	***earthy***	Settleability:	***not obtained***
		Other:	

8. Return/waste sludge:
   a. return rate: ***1200 gpm to Anoxic Reactor #1 (7-Day FEB)***
   b. waste rate: ***Varies depending on operational status of belt press***
   c. frequency of wasting: ***Varies depending on operational status of belt press***
9. Aeration system control: [ ] Time Clock [x] Manual [ ] Continuous [ ] Other
10. Effluent control devices working properly ***(oxidation ditches)***? [ ] Yes [ ] No [x] N/A
11. General condition: [x] Good [ ] Fair [ ] Poor

Comments: Diffused air is provided by three dedicated blowers; 2 of the 3 blowers were operating at the time of the inspection. Temperature, dissolved oxygen, and pH are continuously monitored in situ. The aeration cycle is manually controlled as needed in order to maintain the target operating range for D.O. between 2 and 3 mg/L.

MgOH is added prior to CMAS for alkalinity and pH control. The CMAS is also equipped with two recirculation pumps to aid mixing. The CMAS is equipped with an overflow riser to the 7-Day FEB. RAS from the clarifier returns to the 7-Day FEB.

UNIT PROCESS: Anoxic Reactor #3 and Aerobic Reactor #4

1. Number of units: ***1 tank divided by a partition that contains both reactors***
   Number of units in operation: ***2***
2. Mode of operation: ***BNR***
3. Proper flow distribution between units? [x] Yes [ ] No [ ] N/A
4. Foam control operational? [ ] Yes [ ] No [x] N/A
5. Scum control operational? [ ] Yes [ ] No [x] N/A
6. Evidence of the following problems:
   a. Dead spots? [ ] Yes [x] No
   b. Excessive foam? [ ] Yes [x] No
   c. Poor aeration? [ ] Yes [x] No
   d. Excessive aeration? [ ] Yes [x] No
   e. Excessive scum? [ ] Yes [x] No
   f. Aeration equipment malfunction? [ ] Yes [x] No
   g. Other:
7. Mixed liquor characteristics (as available) ***As viewed during the inspection on the Allen Bradley control system for Reactor #4***

pH:	***not obtained***	MLSS:	***not obtained***
DO:	***5.42 mg/L***	SDI:	***not obtained***
SVI:	***not obtained***	Color:	***Medium Brown***
Odor:	***earthy***	Settleability:	***not obtained***
		Other:	***Temperature = 27.4 Celsius; Nitrate = 13.7 mg/L***

8. Return/waste sludge:
   a. return rate: ***Not applicable***
   b. waste rate: ***Not applicable***
   c. frequency of wasting: ***Not applicable***
9. Aeration system control: [ ] Time Clock [ ] Manual [ ] Continuous [x] Other PLC
10. Effluent control devices working properly ***(oxidation ditches)***? [ ] Yes [ ] No [x] N/A
11. General condition: [x] Good [ ] Fair [ ] Poor

Comments: Effluent from Reactor #2 flows to Reactor #3 where final nitrate removal occurs by biological denitrification. Mixing in this reactor is provided by 2, 10 HP floating surface mixers. After Reactor #3, wastewater flows over the baffle wall and into Aerobic Reactor #4, which serves as a polishing reactor for final removal of soluble CBOD and ammonia nitrogen. Diffused air is supplied to Reactor #4 via 2, 50 HP blowers. From Reactor #4, wastewater gravity flows to the secondary clarifier. Aluminum sulfate is continuously added as a coagulant (to aid phosphorus removal) to Reactor #4 at a rate of 1700 mL/min. At the time of the inspection, an aboveground line was feeding aluminum sulfate to Reactor #4 since the subsurface line was reportedly damaged.

Wastewater Facility Inspection Report

Permit # VA0004031

UNIT PROCESS: Sedimentation

[ ] Primary [x] Secondary [ ] Tertiary

1.	Number of units:	*1*			
	In operation:	*1*			
2.	Proper flow-distribution between units?	[ ] Yes	[ ] No	[x] N/A	
3.	Signs of short-circuiting and/or overloads?	[ ] Yes	[x] No		
4.	Effluent weirs level?	[x] Yes	[ ] No	[ ] N/A	
	Clean?	[ ] Yes	[x] No		
5.	Scum collection system working properly?	[ ] Yes	[x] No	[ ] N/A	
6.	Sludge-collection system working properly?	[x] Yes	[ ] No	[ ] N/A	
7.	Influent, effluent baffle systems working properly?	[x] Yes	[ ] No	[ ] N/A	
8.	Chemical addition?	[ ] Yes	[x] No		
	Chemicals:				
9.	Effluent characteristics:	***clear with a trace of solids***			
10.	General condition:	[ ] Good	[ ] Fair	[x] Poor	***See comments below***

Comments: The entire surface of the clarifier contained a layer of floating solids. Some trace amounts of suspended solids appeared to be in the effluent from the clarifier. At the time of the inspection, the skimming mechanism for the clarifier was not operating. Reportedly, the skimmer arm got caught on one of the scum troughs at the end of July, 2013 and damaged the system. The initial attempt to repair the system failed due to improper parts. It was reported that the skimming system should be repaired the week following this inspection. In a follow-up conversation with Mr. French on 10/2/2013, it was noted that the clarifier has not yet been repaired, but they anticipate the repairs occurring in the next week. Mr. French confirmed that they are not experiencing any issues with final effluent from the treatment process as a result of the problem with the clarifier. From the clarifier, flow is gravity fed to the tertiary sand filters which is likely preventing solids from entering effluent from the treatment plant.

Wastewater Facility Inspection Report

Permit # VA0004031

UNIT PROCESS: Sludge Pumping

(RAS and WAS)

1. Number of Pumps: ***2***
Number of pumps in operation: ***1***

2. Type of sludge pumped: [ ] Primary [ ] Secondary [x] Return Activated
[ ] Combination [x] Other: WAS

3. Type of pump: [ ] Plunger [ ] Diaphragm [ ] Screwlift
[x] Centrifugal [ ] Progressing cavity [ ] Other:

4. Mode of operation: [x] Manual [ ] Automatic [ ] Other:

5. Sludge volume pumped: ***RAS continuously @ ~ 1200 gallons per minute***
Not wasting to the belt press at the time of inspection due to mechanical problems with the belt press

6. Alarm system for equipment failures or overloads operational? [ ] Yes [ ] No [x] N/A

7. General condition: [x] Good [ ] Fair [ ] Poor

Comments: None

Wastewater Facility Inspection Report

Permit # VA0004031

UNIT PROCESS: Filtration (Tertiary)

1.	Type of filters:	[x] Gravity	[ ] Pressure	[ ] Intermittent
2.	Number of units:	***5***		
	Number in operation:	***5***		
3.	Operation of system:	[x] Automatic	[ ] Semi-automatic	
		[ ] Manual	[ ] Other (specify):	
4.	Proper flow-distribution between units?	[x] Yes	[ ] No	[ ] N/A
5.	Evidence of following problems:			
	a. Uneven flow distribution?	[ ] Yes	[x] No	[ ] N/A
	b. Filter clogging (ponding)?	[ ] Yes	[x] No	[ ] N/A
	c. Nozzles clogging?	[ ] Yes	[ ] No	[x] N/A
	d. Icing?	[ ] Yes	[ ] No	[x] N/A
	e. Filter flies?	[ ] Yes	[x] No	[ ] N/A
	f. Vegetation on filter?	[ ] Yes	[x] No	[ ] N/A
6.	Filter aid system provided?	[x] Yes	[ ] No	
	Properly operating?	[x] Yes	[ ] No	[ ] N/A
	Chemical used:	***None***		
7.	Automatic valves properly operating?	[x] Yes	[ ] No	[ ] N/A
8.	Valves sequencing correctly?	[x] Yes	[ ] No	[ ] N/A
9.	Backwash system operating properly?	[x] Yes	[ ] No	[ ] N/A
10.	Filter building adequately ventilated?	[x] Yes	[ ] No	[ ] N/A
11.	Effluent characteristics:	***Clear***		
12.	General condition:	[x] Good	[ ] Fair	[ ] Poor

Comments: Continuous backwash filters replaced the previous filters since the last inspection. Filter backwash gravity feeds to the 7-Day FEB.

Wastewater Facility Inspection Report

Permit # VA0004031

UNIT PROCESS: Ultraviolet (UV) Disinfection

1.	Number of UV lamps/assemblies:	**2 Banks in series, each with 40 lamps**
	Number in operation:	**1 (second bank is backup)**
2.	Type of UV system and design dosage:	**Trojan UV 3000 PTP, 14.0 mw/cm^2**
3.	Proper flow distribution between units?	[x] Yes [ ] No [ ] N/A
4.	Method of UV intensity monitoring?	**continuous**
5.	Adequate ventilation of ballast control boxes?	[x] Yes [ ] No [ ] N/A
6.	Indication of on/off status of all lamps provided?	[x] Yes [ ] No
7.	Lamps assemblies easily removed for maintenance?	[x] Yes [ ] No
8.	Records of lamp operating hours & replacement dates provided:	[x] Yes [ ] No
9.	Routine cleaning system provided?	[x] Yes [ ] No
	Operated properly?	[x] Yes [ ] No
	Frequency of routine cleaning:	**Lamps are cleaned every couple of months**
10.	Lamp energy control system operating properly?	[x] Yes [ ] No
11.	Date of last system overhaul:	**not determined**
	a. UV unit completely drained	[ ] Yes [ ] No
	b. all surfaces cleaned	[ ] Yes [ ] No
	c. UV transmissibility checked	[ ] Yes [ ] No
	d. output of selected lamps checked	[ ] Yes [ ] No
	e. output of tested lamps	
	f. total operating hours, oldest lamp/assembly	
	g. number of spare lamps and ballasts available:	**not determined**
12.	UV protective eyeglasses provided:	
13.	General condition:	[x] Yes [ ] No
		[x] Good [ ] Fair [ ] Poor

Comments: Bulbs are replaced in the system after 12,000 hours of use. From here, flow goes to the old chlorine contact tank before the final effluent is discharged.

Wastewater Facility Inspection Report

Permit # VA0004031

UNIT PROCESS: Post Aeration

1. Number of units: ***1***

Number of units in operation: ***1***

2. Proper flow distribution between units? [ ] Yes [ ] No [x] N/A

3. Evidence of following problems:

a. Dead spots? [ ] Yes [x] No

b. Excessive foam? [ ] Yes [x] No

c. Poor aeration? [ ] Yes [x] No

d. Mechanical equipment failure? [ ] Yes [x] No [ ] N/A

4. How is the aerator controlled? [ ] Time clock [x] Manual [ ] Continuous
[ ] Other _____ [ ] N/A

5. What is the current operating schedule? ***continuous***

6. Step weirs level? [ ] Yes [ ] No* [x] N/A

7. Effluent D.O. level: ***9.63 mg/L at 0640 (as reported by the facility)***

8. General condition: [x] Good [ ] Fair [ ] Poor

Comments: A blower provides diffused aeration in the old chlorine contact channel.

Wastewater Facility Inspection Report

Permit # VA0004031

UNIT PROCESS: Flow Measurement

[ ] Influent [ ] Intermediate [x] Effluent

1.	Type measuring device:	***90° v-notch weir and an ultra-sonic sensor (TIR equip.)***		
2.	Present reading:	***438 gallons per minute at 1222 on 8/30/2013***		
3.	Bypass channel?	[ ] Yes	[x] No	
	Metered?	[ ] Yes	[ ] No	[x] N/A
4.	Return flows discharged upstream from meter?	[ ] Yes	[x] No	
	If Yes, identify:			
5.	Device operating properly?	[x] Yes	[ ] No	
6.	Date of last calibration:	***8/14/2013***		
7.	Evidence of following problems:			
	a. Obstructions?	[ ] Yes	[x] No	
	b. Grease?	[ ] Yes	[x] No	
8.	General condition:	[x] Good	[ ] Fair	[ ] Poor

Comments:

UNIT PROCESS: Pressure Filtration (Sludge)

(Belt Press)

1. Number of units:	*1*
Number In operation:	*0*
2. Percent solids in influent sludge:	***Not obtained***
3. Percent solids in discharge cake:	***Not obtained***
4. Filter run time:	***Not obtained***
5. Amount cake produced:	***Not obtained***
6. Conditioning chemicals used:	[x] Yes [ ] No
Type and Dose:	***Cationic Emulsion; dose not obtained***
7. Sludge pumping:	[x] Manual [ ] Automatic
8. Recirculating system included on acid wash:	[ ] Yes [ ] No [x] N/A
9. Signs of overloads?	[ ] Yes [x] No
10. General condition:	[x] Good [ ] Fair [ ] Poor

Comments: The belt press is located in the DAF building and it is used when it is operational. The belt press was not operating at the time of the inspection due to mechanical problems.

Wastewater Facility Inspection Report

Permit # VA0004031

EFFLUENT FIELD DATA: For 8/30/2013

Flow	MGD	**Dissolved Oxygen**	9.36 mg/l	**TRC (Contact Tank)**	mg/l
pH	6.71 S.U.	**Temperature**	°C	**TRC (Final Effluent)**	mg/l
Was a Sampling Inspection conducted?	☐ Yes (see Sampling Inspection Report) ☑ No				

CONDITION OF OUTFALL AND EFFLUENT CHARACTERISTICS:

1. Type of outfall:
   ☑ Shore based ☐ Submerged
   Diffuser?
   ☐ Yes ☑ No

2. Are the outfall and supporting structures in good condition?
   ☑ Yes ☐ No
3. Final Effluent (evidence of following problems): **None**
   ☐ Sludge bar ☐ Grease ☐ Turbid effluent ☐ Visible foam ☐ Unusual color ☐ Oil sheen
4. Is there a visible effluent plume in the receiving stream? **The receiving stream was not observed**
   ☐ Yes ☐ No
5. Receiving stream: **The receiving stream was not observed**

   ☐ No observed problems

   ☐ Indication of problems (explain below)

   Comments: The receiving stream was not observed. Effluent from the treatment and effluent in the discharge channel that runs across the property was clear. Fish were observed in the discharge channel.

REQUEST for ACTION:

1. **None**

NOTES and COMMENTS:

1. The clarifier is in need of repairs. During the inspection, the surface of the clarifier was covered in floating solids. During a follow-up conversation with Mr. French on October, 2, 2013, this inspector inquired as to whether the clarifier had been repaired since the inspection. During that discussion, it was reported that the repairs should be completed sometime the following week. The presence of significant solids on the surface increases the potential for solids to enter the effluent leaving the clarifier. Increased solids flowing to the sand filters may decrease filtering capability. The clarifier does not appear to be operating in accordance with the operations and maintenance manual and should be repaired as soon as possible.
2. The sludge filter belt press was not operating at the time of the inspection due to mechanical problems. It was reported that wasting to the press occurs when the press is operational, but that the press is not consistently operational. During a follow-up conversation with Mr. French on October 2, 2013, the press had been operating successfully for the previous two weeks. It appears that the press could benefit from additional routine maintenance being performed to ensure that the press is available when needed.
3. A review of the VAN040089 – General Permit for Total Nitrogen and Total Phosphorus Discharges - discharge monitoring report for the July, 2013 monitoring period was performed as part of this inspection. Copies of the certificates of analysis from "Air Water and Soil Laboratories, Inc." for the July, 2013 monitoring period were reviewed and the nutrient loading calculations for July, 2013 were duplicated by this inspector. The nutrient discharge monitoring report for July, 2013 appears to be complete and accurate.
4. The waste sludge pond is no longer in service, so the facility depends on the belt press to be operating properly in order to waste sludge.

Wastewater Facility Inspection Report

Permit # VA0004031

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

1. Has a SWPPP been developed and implemented? [x] Yes [ ] No

2. Was the SWPPP, compliance inspection report, and other information available and is the SWPPP current? [x] Yes [ ] No

3. Contents must include:
   Pollution prevention team identification and responsibilities [x] Yes [ ] No

   Description of potential pollutant sources must include: [x] Yes [ ] No
   - Detailed site drainage map
   - Inventory of exposed materials
   - Updated list of spills and leaks of toxic or hazardous pollutants
   - Sampling data N/A
   - Risk identification and summary of potential pollutant sources

   Measures and controls must include: [x] Yes [ ] No
   - Good housekeeping
   - Preventive maintenance
   - Spill prevention and response procedures
   - Routine inspections and visual exam of storm water samples plus documentation and follow up tracking and procedures
   - Employee training
   - Record keeping and internal reporting procedures
   - Sediment and erosion control
   - Management of run-off

   Annual Comprehensive site compliance evaluation? [x] Yes [ ] No
   - Visual inspection of all areas contributing to a storm water discharge with industrial activity; evaluation of measures to reduce pollutant loadings; observing structural storm water management measures, sediment and erosion control measures, and other structural pollution prevention measures; visual inspection of equipment needed to implement the plan
   - Based on results of evaluation, revise SWPPP
   - Compliance inspection report summarizing the scope of the evaluation, personnel making evaluation, dates of evaluation, major observations, actions taken, certification of compliance and signatory requirements met

   Requirements for facilities subject to Emergency Planning and Community Right to Know Act (EPCRA) Section 313 [x] Yes [ ] No

Comments: The SWPPP was last updated on 1/7/2013 upon completion of the comprehensive site compliance evaluation that was completed on the same day. Quarterly visual monitoring for the first and second quarters of 2013 was reviewed during this inspection.

LABORATORY INSPECTION

PRESENT DURING INSPECTION: Austin French	
1. Do lab records include sampling date/time, analysis date/time, sample location, test method, test results, analyst's initials, instrument calibration and maintenance, and Certificate of Analysis? ☑ Sampling Date/Time ☑ Analysis Date/Time ☑ Sample Location ☑ Test Method ☑ Test Results ☑ Analyst's Initials ☑ Instrument Calibration & Maintenance ☑ Chain of Custody ☑ Certificate of Analysis	
2. Are Discharge Monitoring Reports complete and correct? Month(s) reviewed: July, 2013	☑ Yes ☐ No
3. Are sample location(s) according to permit requirements (after all treatment unless otherwise specified)?	☑ Yes ☐ No
4. Are sample collection, preservation, and holding times appropriate; and is sampling equipment adequate?	☑ Yes ☐ No
5. Are grab and composite samples representative of the flow and the nature of the monitored activity?	☑ Yes ☐ No
6. If analysis is performed at another location, are shipping procedures adequate? List parameters and name & address of contract lab(s): **BOD, TSS, Fecal Coliform, Total Phosphorus, Total Nitrogen, Ammonia, TKN, Settleable Solids, E. Coli, Total Recoverable Zinc, and Total Nitrite and Nitrate is performed by Air Water and Soil Laboratories, Inc. in Richmond, VA.**	☑ Yes ☐ No
7. Is Laboratory equipment in proper operating range? Auto sampler: temperature not observed during this inspection.	☑ Yes ☐ No
8. Are annual thermometer calibration(s) adequate? **Not determined**	☐ Yes ☐ No
9. Is the laboratory grade water supply adequate? **Not Applicable**	☐ Yes ☐ No
10. Are analytical balance(s) adequate? **Not Applicable**	☐ Yes ☐ No

11. Parameters evaluated during this inspection (attach checklists):

- [x] pH
- [ ] Temperature
- [x] Total Residual Chlorine
- [x] Dissolved Oxygen
- [ ] Biochemical Oxygen Demand
- [ ] Total Suspended Solids
- [ ] Other (specify) _____
- [ ] Other (specify) _____
- [ ] Other (specify) _____

Comments:

LABORATORY INSPECTION
REQUEST for ACTION:

1. In May 2012, EPA issued a final rule to approve several new or revised analytical methods for measuring regulated pollutants in wastewater. This rule is also called the Methods Update Rule (MUR). One of the changes in this MUR is the naming convention used for citing Standard Methods. Citing the edition of Standard Methods is no longer applicable; now the citation must include the "date tag" in which the method was approved. Also note that for pH, D.O. and TRC, the 18th and 19th Editions of Standard Methods are no longer approved. Only the 20th, 21st and online Editions are approved. The current method citations are: D.O.: SM4500-O G -2001; pH: SM4500-H^+ B -2000; TRC: SM4500-Cl G -2000 **[This item is new guidance and does not require a response]**
2. During the inspection, it was not determined if the thermistor present in the pH and D.O. meter is verified annually. The thermistor in the pH and D.O. meter should be verified against a NIST certified thermometer annually. **No response to this item is required.**
3. Initial Demonstration of Capability (IDC) must be completed by each operator who analyzes samples for pH, TRC, and D.O. **This item is new guidance and was discussed during the inspection, so no response is necessary. Please see the enclosed forms for instructions. Please note that there are no specific credentials required for the witness involved with the IDC.**
4. Three buffers should be used to perform the daily calibration of the pH meter. **This item was discussed during the inspection so no response to this item is required.**

NOTES and COMMENTS:

None

Wastewater Facility Inspection Report

ANALYST:	**Discussed with Austin French**	VPDES NO	**VA0004031**

Meter: **YSI 52**

Parameter: Dissolved Oxygen
Method: Membrane Electrode
Facility Elevation: approximately240'
1/08

METHOD OF ANALYSIS:

X	18th Edition of Standard Methods – 4500-O G
	21st or Online Editions of Standard Methods – 4500-O G (01)

	DO is a method-defined analyte so modifications are not allowed. [40 CFR Part 136.6]	**Y**	**N**
1)	Is a certificate of operator competence or initial demonstration of capability available for each analyst/operator performing this analysis? [SM 1020 B.1]		**X**
2)	If samples are collected, is collection carried out with a minimum of turbulence and air bubble formation and is the sample bottle allowed to overflow several times its volume? [1.c]	**X**	
3)	Are meter and electrode operable and providing consistent readings? [3]	**X**	
4)	Is membrane in good condition without trapped air bubbles? [3.b]	**X**	
5)	Is correct filling solution used in electrode? [Mfr.]	**X**	
6)	Are water droplets shaken off the membrane prior to calibration? [Mfr.]	**X**	
7)	Is meter calibrated before use or at least daily? [Mfr. & Part 1020]	**X**	
8)	Is calibration procedure performed according to manufacturer's instructions? [Mfr.]	**X**	
9)	Is sample stirred during analysis? [Mfr.]	**X**	
10)	Is the sample analysis procedure performed according to manufacturer's instructions? [Mfr.]	**X**	
11)	Is meter stabilized before reading D.O.? [Mfr.]	**X**	
12)	Is electrode stored according to manufacturer's instructions? [Mfr.]	**X**	

PROBLEMS: **An Initial Demonstration of Capability (IDC) needs to be completed. Mr. French believed that the meter was set to an elevation, but he was unable to confirm while onsite. The meter should be evaluated to confirm that it is set to the appropriate elevation for the facility. The approximate elevation for the facility as noted above is 240 feet. This elevation was noted on the inspection report for the inspection conducted on April 2, 2008.**

Wastewater Facility Inspection Report

ANALYST:	Discussed with Austin French	VPDES NO	VA0004031

Meter: **HQ 30d HACH Meter**

Parameter: Hydrogen Ion (pH)
1/08

Method: Electrometric

METHOD OF ANALYSIS:

X	18th Edition of Standard Methods – 4500-H^+ B
	21st or Online Editions of Standard Methods – 4500-H^+ B (00)

	pH is a method-defined analyte so modifications are not allowed. [40 CFR Part 136.6]	Y	N
1)	Is a certificate of operator competence or initial demonstration of capability available for each analyst/operator performing this analysis? **NOTE**: Analyze 4 samples of known pH. May use external source of buffer (different lot/manufacturer than buffers used to calibrate meter). Recovery for each of the 4 samples must be +/- 0.1 SU of the known concentration of the sample. [SM 1020 B.1]		X
2)	Is the electrode in good condition (no chloride precipitate, scratches, deterioration, etc.)? [2.b/c and 5.b]	X	
3)	Is electrode storage solution in accordance with manufacturer's instructions? [Mfr.]	X	
4)	Is meter calibrated on at least a daily basis using three buffers all of which are at the same temperature? [4.a] **NOTE**: Follow manufacturer's instructions. ***Only two buffers***		X
5)	After calibration, is a buffer analyzed as a check sample to verify that calibration is correct? Agreement should be within +/- 0.1 SU. [4.a]	X	
6)	Do the buffer solutions appear to be free of contamination or growths? [3.1]	X	
7)	Are buffer solutions within the listed shelf-life or have they been prepared within the last 4 weeks? [3.a]	X	
8)	Is the cap or sleeve covering the access hole on the reference electrode removed when measuring pH? [Mfr.]	X	
9)	For meters with ATC that also have temperature display, is the thermometer verified annually? [SM 2550 B.1]	**Not determined**	
10)	Is temperature of buffer solutions and samples recorded when determining pH? [4.a]	X	
11)	Is sample analyzed within 15 minutes of collections? [40 CFR Part 136]	X	
12)	Is the electrode rinsed and then blotted dry between reading solutions (Disregard if a portion of the next sample analyzed is used as the rinsing solution.)? [4.a]	X	
13)	Is the sample stirred gently at a constant speed during measurement? [4.b]	X	
14)	Does the meter hold a steady reading after reaching equilibrium? [4.b]	X	

PROBLEMS: **An IDC needs to be completed and only two buffers are currently being used along with a post calibration check. It was not determined if the thermistor is verified annually with a NIST thermometer.**

Wastewater Facility Inspection Report

ANALYST:	Discussed with Austin French	VPDES NO.	VA0004031

Instrument: **DR 2800 HACH Meter**

Parameter: Total Residual Chlorine (TRC)
Method: DPD Colorimetric (HACH Pocket Colorimeter)
1/08

METHOD OF ANALYSIS:

X	HACH Manufacturer's Instructions (Method 8167) plus an edition of *Standard Methods*
X	18th Edition of *Standard Methods* 4500-Cl G
	21st Edition of *Standard Methods* 4500-Cl G (00)

		Y	N
1)	Is a certificate of operator competence or initial demonstration of capability available for each analyst/operator performing this analysis? **NOTE:** Analyze 4 samples of known TRC. Must use a lot number or source that is different from that used to prepare calibration standards. May not use Spec√ ™. [SM 1020 B.1]		X
2)	Are the DPD PermaChem™ Powder Pillows stored in a cool, dry place? [Mfr.]	X	
3)	Are the pillows within the manufacturer's expiration date? [Mfr.] ***pillows expire 11/2016***	X	
4)	Has buffering capability of DPD pillows been checked annually? (Pillows should adjust sample pH to between 6 and 7) [Mfr.]	X	
5)	When pH adjustment is required, is H_2SO_4 or NaOH used? [Hach 11.3.1]	X	
6)	Are cells clean and in good condition? [Mfr]	X	
7)	Is the low range (0.01 mg/L resolution) used for samples containing residuals from 0.2.00 mg/L? [Mfr.]	X	
8)	Is calibration curve developed (may use manufacturer's calibration) with daily verification using a high and a low standard? **NOTE:** May use manufacturer's installed calibration and commercially available chlorine standards for daily calibration verifications. [18th ed 1020 B.5; 21st ed 4020 B.2.b]	X	
9)	Is the 10-mL cell (2.5-cm diameter) used for samples from 0-2.00 mg/L? [Mfr.]	X	
10)	Is meter zeroed correctly by using sample as blank for the cell used? [Mfr.]	X	
11)	Is the instrument cap placed correctly on the meter body when the meter is zeroed and when the sample is analyzed? [Mfr.]	X	
12)	Is the DPD Total Chlorine PermaChem™ Powder Pillow mixed into the sample? [Hach 11.1]	X	
13)	Is the analysis made at least three minutes but not more than six minutes after PermaChem™ Powder Pillow addition? [Hach 11.2]	X	
14)	If read-out is flashing [2.20], is sample diluted correctly, and then reanalyzed? [Hach 1.2 & 2.0]	X	
15)	Are samples analyzed within 15 minutes of collection? [40 CFR Part 136]	X	

PROBLEMS: **An IDC needs to be completed.**

Wastewater Facility Inspection Report

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION

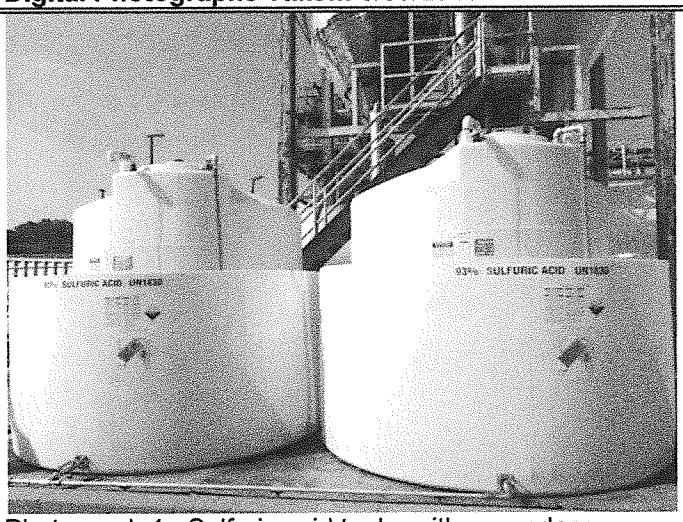
SAMPLE ANALYSIS HOLDING TIME/CONTAINER/PRESERVATION CHECK SHEET

Revised 04/13 [40 CFR, Part 136.3, Table II]

FACILITY NAME:	**Tyson Foods, Inc.**	VPDES NO	**VA0004031**	DATE:	**August 30, 2013**

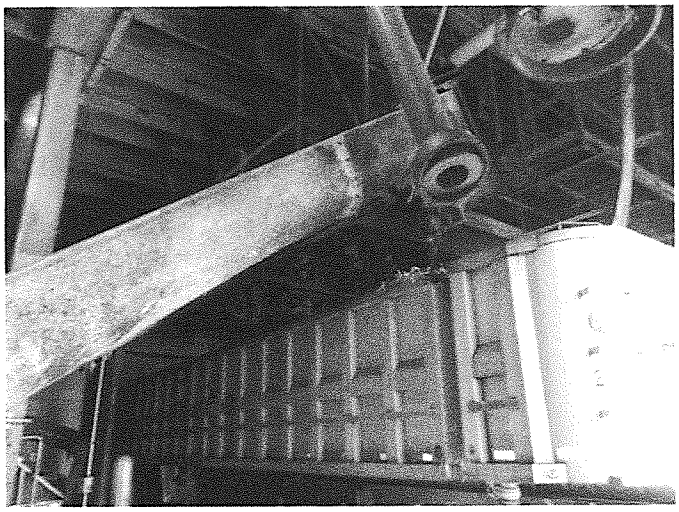
HOLDING TIMES *[Note: Collection period (for composites) and Sample Collection time (end of collection period) must be recorded on the COC.]*						**SAMPLE CONTAINER**				**PRESERVATION** *[Note: Preservation is to occur within 15 minutes of the end of the collection period.]*				
PARAMETER	APPROVED	MET?		LOGGED?		ADEQ. VOLUME		APPROP. TYPE		APPROVED	MET?		CHECKED?	
		Y	N	Y	N	Y	N	Y	N		Y	N	Y	N
pH	15 MIN.	X		X		X		X		N/A				
CHLORINE	15 MIN.	X		X		X		X		N/A				
DISSOLVED 0_2	15 MIN./IN SITU	X		X		X		X		N/A				
TEMPERATURE	IMMERSION STAB.									N/A				
BOD5 & CBOD5	48 HOURS	X		X		X		X		ANALYZE 2 HRS or ≤6° C	X		X	
TSS	7 DAYS	X		X		X		X		≤6° C	X		X	
FECAL COLIFORM / *E. coli / Enterococci*	6 HRS & 2 HRS TO PROCESS	X		X		X		X		<10° C (1 HOUR)+0.008% $Na_2S_2O_3$	X		X	
OIL & GREASE	28 DAYS	X		X		X		X		≤6° C+H_2SO_4/HCL pH<2	X		X	
AMMONIA	28 DAYS	X		X		X		X		≤6° C+H_2S0_4 pH<2 DECHLOR	X		X	
TKN	28 DAYS	X		X		X		X		≤6° C+H_2S0_4 pH<2 DECHLOR	X		X	
NITRATE	48 HOURS									≤6° C				
NITRATE+NITRITE	28 DAYS	X		X		X		X		≤6° C+H_2S0_4 pH<2	X		X	
NITRITE	48 HOURS									≤6° C				
PHOSPHATE, ORTHO	48 HOURS									FILTER, ≤6° C				
TOTAL PHOS.	28 DAYS	X		X		X		X		≤6° C+H_2S0_4 pH<2	X		X	
METALS (except Hg)	6 MONTHS	X		X		X		X		HNO_3 pH<2	X		X	
MERCURY	28 DAYS													
PROBLEMS: None														

Digital Photographs Taken: 8/30/2013



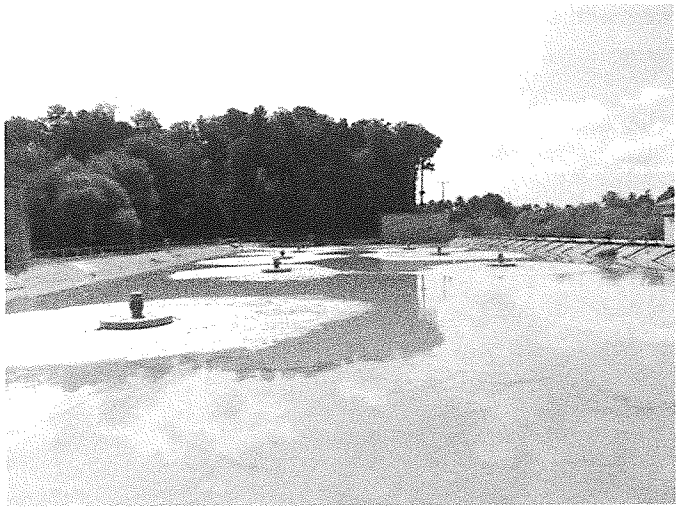
Photograph 1: Sulfuric acid tanks with secondary containment

Photograph 2: Dissolved Air Floatation (DAF) unit



Photograph 3: Trailer receiving screenings

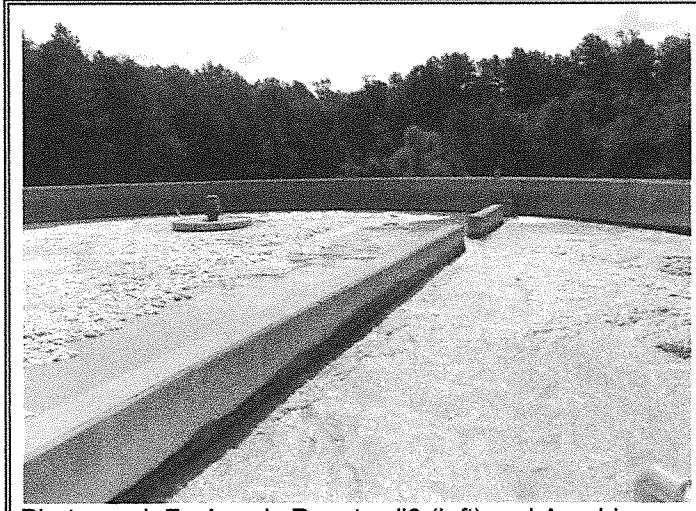
Photograph 4: Trees that were reportedly planted to block the view of the treatment plant from state route 33



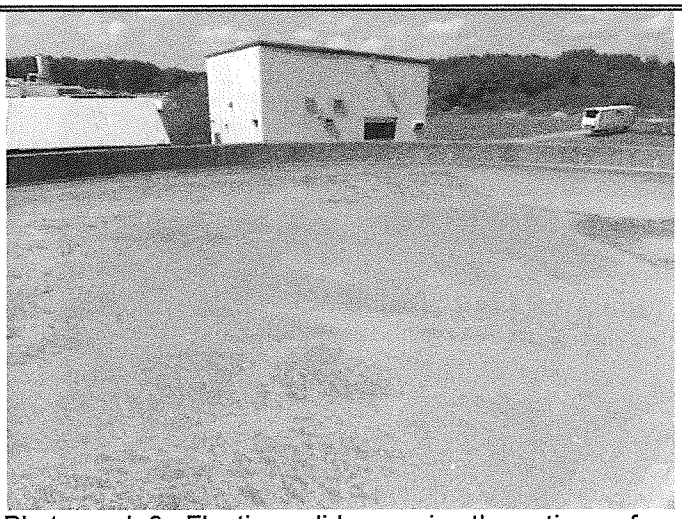
Photograph 5: Anoxic Reactor #1 (7-Day FEB)

Photograph 6: Aerobic Reactor #2 (CMAS)

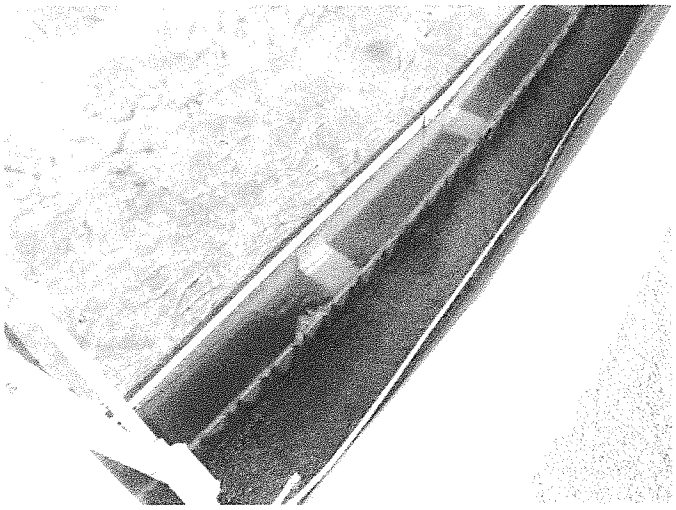
Digital Photographs Taken: 8/9/2013



Photograph 7: Anoxic Reactor #3 (left) and Aerobic Reactor #4 (right)

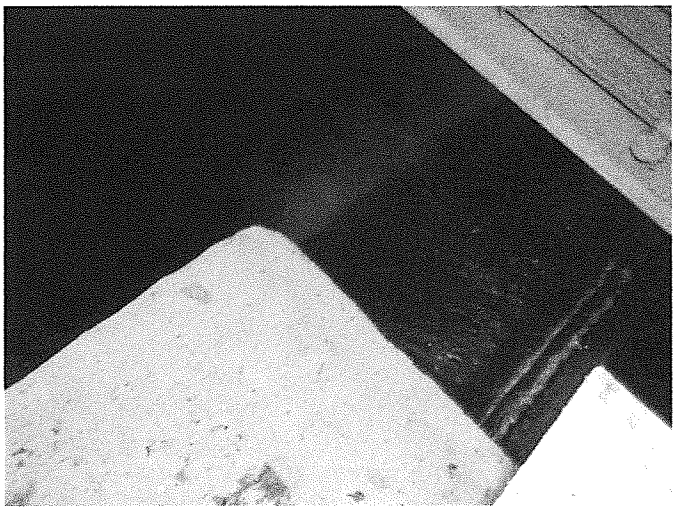


Photograph 8: Floating solids covering the entire surface of the clarifier

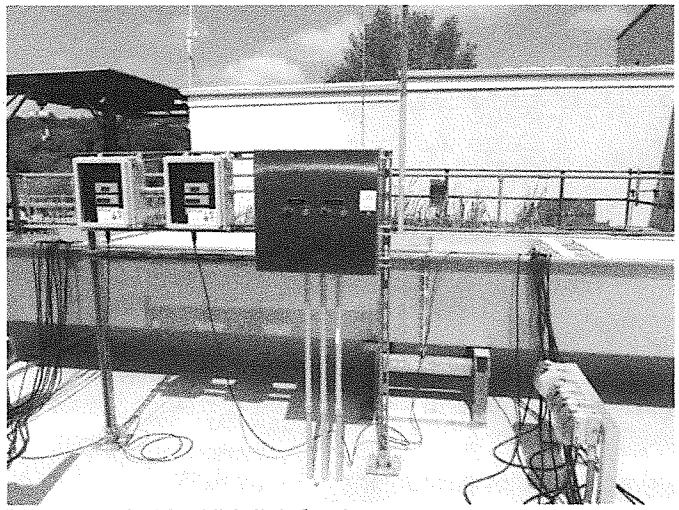


Photograph 9: Mostly clear effluent from the clarifier; a trace of solids was noted in the effluent channel

Photograph 10: Photo depicts solids between scum baffle and weir with an algal mat in the effluent channel

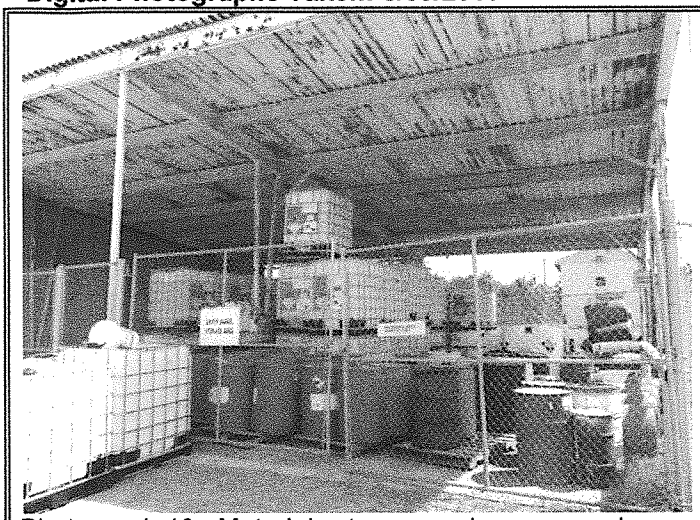


Photograph 11: Clear effluent flow from the sand filters

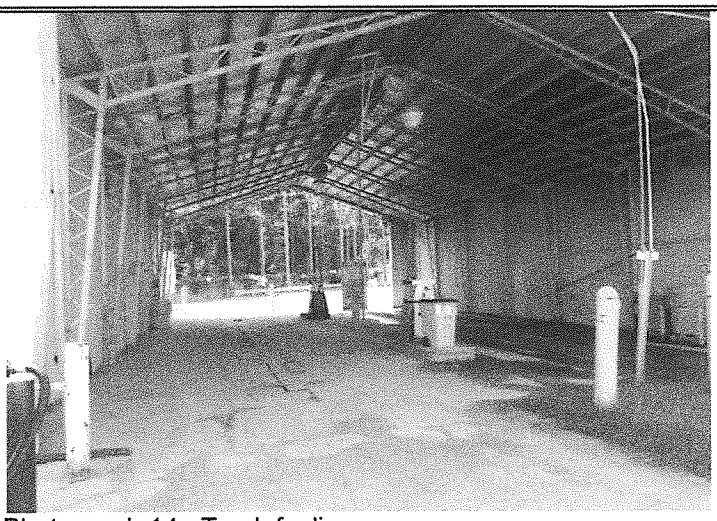


Photograph 12: UV disinfection system

Digital Photographs Taken: 8/30/2013

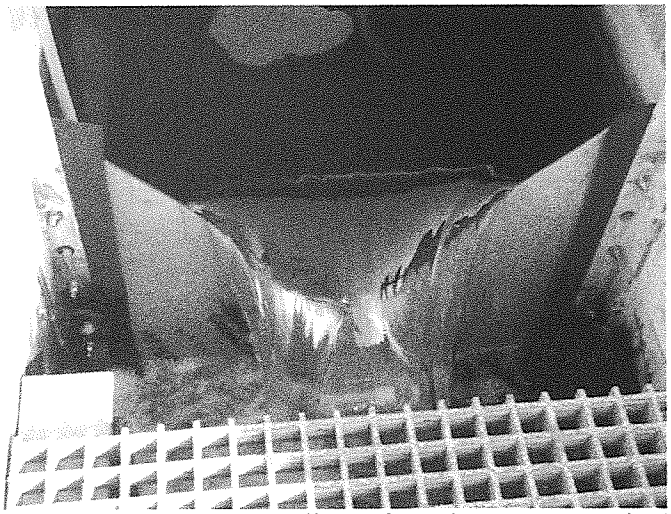


Photograph 13: Materials storage under cover and fenced in

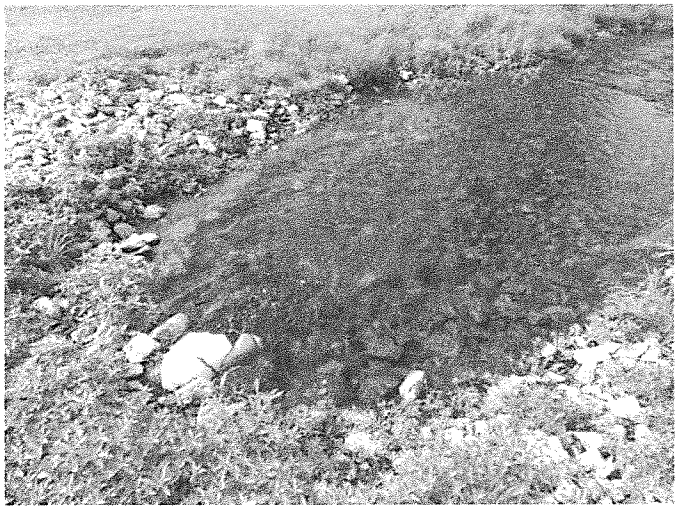


Photograph 14: Truck fueling area

Photograph 15: Spill kit in the truck fueling area



Photograph 16: Final clear effluent from the treatment plant



Photograph 17: Clear effluent in the discharge channel for the treatment plant; fish were observed in this channel

Photograph 18: Location where the stormwater outfall 002 combines with flow from outfall 001

Attachment D: Applicable Federal Effluent Limitation Guidelines

Subpart K—Poultry First Processing

§432.110 Applicability.

This part applies to discharges of process wastewater resulting from the slaughtering of poultry, further processing of poultry and rendering of material derived from slaughtered poultry. Process wastewater includes water from animal holding areas at these facilities.

§432.111 Special definitions.

For the purpose of this subpart: *Poultry first processing* means slaughtering of poultry and producing whole, halved, quarter or smaller meat cuts.

§432.112 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart that slaughters more than 100 million pounds per year (in units of LWK) must achieve the following effluent limitations representing the application of BPT:

Effluent Limitations

[BPT]

Regulated parameter	Maximum daily[1]	Maximum monthly avg.[1]
Ammonia (as N)	8.0	4.0
BOD_5	26	16
Fecal Coliform	([2])	([3])
O&G (as HEM)	14	8.0
TSS	30	20

[1]mg/L (ppm).

[2]Maximum of 400 MPN or CFU per 100 mL at any time.

[3]No maximum monthly average limitation.

§432.113 Effluent limitations attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart that slaughters more than 100 million pounds per year (in units of LWK) must achieve the following effluent limitations representing the application of BAT:

Effluent Limitations

[BAT]

Regulated parameter	Maximum daily[1]	Maximum monthly avg.[1]
Ammonia (as N)	8.0	4.0
Total Nitrogen	147	103

[1]mg/L (ppm).

§432.114 Pretreatment standards for existing sources (PSES). [Reserved]

§432.115 New source performance standards (NSPS).

Any source that is a new source subject to this subpart must achieve the following performance standards:

(a) Facilities that slaughter no more than 100 million pounds per year (in units of LWK) must achieve the following performance standards:

Performance Standards

[NSPS]

Regulated parameter	Maximum daily[1]	Maximum monthly avg.[1]
Ammonia (as N)	8.0	4.0
BOD_5	26	16
Fecal Coliform	([2])	([3])
O&G (as HEM)	14	8.0
TSS	30	20

[1]mg/L (ppm).

[2]Maximum of 400 MPN or CFU per 100 mL at any time.

[3]No maximum monthly average limitation.

(b) Facilities that slaughter more than 100 million pounds per year (in units of LWK) must achieve the following performance standards:

Performance Standards

[NSPS]

Regulated parameter	Maximum daily[1]	Maximum monthly avg.[1]

Ammonia (as N)	8.0	4.0
BOD_5	26	16
Fecal Coliform	([2])	([3])
O&G (as HEM)	14	8.0
TSS	30	20
Total Nitrogen	147	103

[1]mg/L (ppm).

[2]Maximum of 400 MPN or CFU per 100 mL at any time.

[3]No maximum monthly average limitation.

§432.116 Pretreatment standards for new sources (PSNS). [Reserved]

§432.117 Effluent limitations attainable by the application of the best control technology for conventional pollutants (BCT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the application of BCT: Limitations for BOD_5, TSS, O&G (as HEM), and fecal coliform are the same as the corresponding limitation specified in §432.112.

Attachment E: Facility Effluent Data Outfall 001
(Water Quality Criteria Monitoring and Application Data)

ATTACHMENT A
DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY CRITERIA MONITORING

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
METALS						
7440-36-0	Antimony, dissolved	(3)	1.4	< 0.0014 mg/l	G or C	1/5 YR
7440-38-2	Arsenic, dissolved	(3)	1.0	< 0.001 mg/l	G or C	1/5 YR
7440-43-9	Cadmium, dissolved	(3)	0.30	< 0.003 mg/l	G or C	1/5 YR
16065-83-1	Chromium III, dissolved [8]	(3)	3.6	< 0.0036 mg/l	G or C	1/5 YR
18540-29-9	Chromium VI, dissolved [8]	(3)	1.6	< 0.0016 mg/l	G or C	1/5 YR
7440-50-8	Copper, dissolved	(3)	0.50	< 0.0005 mg/l	G or C	1/5 YR
7439-92-1	Lead, dissolved	(3)	0.50	< 0.0005 mg/l	G or C	1/5 YR
7439-97-6	Mercury, dissolved	(3)	1.0	< 0.0002 mg/l	G or C	1/5 YR
7440-02-0	Nickel, dissolved	(3)	0.94	< 0.00094 mg/l	G or C	1/5 YR
7782-49-2	Selenium, Total Recoverable	(3)	2.0	< 0.002 mg/l	G or C	1/5 YR
7440-22-4	Silver, dissolved	(3)	0.20	< 0.0002 mg/l	G or C	1/5 YR
7440-28-0	Thallium, dissolved	(4)	(5)	< 0.002 mg/l	G or C	1/5 YR
7440-66-6	Zinc, dissolved	(3)	3.6	< 0.0036 mg/l	G or C	1/5 YR
PESTICIDES/PCB'S						
309-00-2	Aldrin	608	0.05	<.05 ug/l	G or C	1/5 YR
57-74-9	Chlordane	608	0.2	<.20 ug/l	G or C	1/5 YR
2921-88-2	Chlorpyrifos (synonym = Dursban)	622	(5)	< 0.2 ug/l	G or C	1/5 YR
72-54-8	DDD	608	0.1	< .10 ug/l	G or C	1/5 YR
72-55-9	DDE	608	0.1	< .10 ug/l	G or C	1/5 YR
50-29-3	DDT	608	0.1	< .10 ug/l	G or C	1/5 YR
8065-48-3	Demeton	(4)	(5)	< 1 ug/l	G or C	1/5 YR
333-41-5	Diazinon	(4)	(5)	< 1 ug/l	G or C	1/5 YR
60-57-1	Dieldrin	608	0.1	< .10 ug/l	G or C	1/5 YR
959-98-8	Alpha-Endosulfan	608	0.1	< .10 ug/l	G or C	1/5 YR
33213-65-9	Beta-Endosulfan	608	0.1	< .10 ug/l	G or C	1/5 YR
1031-07-8	Endosulfan Sulfate	608	0.1	< .10 ug/l	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
72-20-8	Endrin	608	0.1	< .10 ug/l	G or C	1/5 YR
7421-93-4	Endrin Aldehyde	(4)	(5)	< .10 ug/l	G or C	1/5 YR
86-50-0	Guthion	622	(5)	< 1 ug/l	G or C	1/5 YR
76-44-8	Heptachlor	608	0.05	< .10 ug/l	G or C	1/5 YR
1024-57-3	Heptachlor Epoxide	(4)	(5)	< .10 ug/l	G or C	1/5 YR
319-84-6	Hexachlorocyclohexane Alpha-BHC	608	(5)	< .05 ug/l	G or C	1/5 YR
319-85-7	Hexachlorocyclohexane Beta-BHC	608	(5)	< .05 ug/l	G or C	1/5 YR
58-89-9	Hexachlorocyclohexane Gamma-BHC or Lindane	608	(5)	< .05 ug/l	G or C	1/5 YR
143-50-0	Kepone	(9)	(5)	< .10 ug/l	G or C	1/5 YR
121-75-5	Malathion	(4)	(5)	< 1 ug/l	G or C	1/5 YR
72-43-5	Methoxychlor	(4)	(5)	< .10 ug/l	G or C	1/5 YR
2385-85-5	Mirex	(4)	(5)	< .10 ug/l	G or C	1/5 YR
56-38-2	Parathion	(4)	(5)	< 1 ug/l	G or C	1/5 YR
1336-36-3	PCB Total	608	7.0	< 1.0 ug/l	G or C	1/5 YR
8001-35-2	Toxaphene	608	5.0	< 5.0 ug/l	G or C	1/5 YR
BASE NEUTRAL EXTRACTABLES						
83-32-9	Acenaphthene	625	10.0	< 10 ug/l	G or C	1/5 YR
120-12-7	Anthracene	625	10.0	< 10 ug/l	G or C	1/5 YR
92-87-5	Benzidine	(4)	(5)	< 10 ug/l	G or C	1/5 YR
56-55-3	Benzo (a) anthracene	625	10.0	< 10 ug/l	G or C	1/5 YR
205-99-2	Benzo (b) fluoranthene	625	10.0	< 10 ug/l	G or C	1/5 YR
207-08-9	Benzo (k) fluoranthene	625	10.0	< 10 ug/l	G or C	1/5 YR
50-32-8	Benzo (a) pyrene	625	10.0	< 10 ug/l	G or C	1/5 YR
111-44-4	Bis 2-Chloroethyl Ether	(4)	(5)	< 10 ug/l	G or C	1/5 YR
108-60-1	Bis 2-Chloroisopropyl Ether	(4)	(5)	< 10 ug/l	G or C	1/5 YR
85-68-7	Butyl benzyl phthalate	625	10.0	< 10 ug/l	G or C	1/5 YR
91-58-7	2-Chloronaphthalene	(4)	(5)	< 10 ug/l	G or C	1/5 YR
218-01-9	Chrysene	625	10.0	< 10 ug/l	G or C	1/5 YR
53-70-3	Dibenz(a,h)anthracene	625	20.0	< 10 ug/l	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
84-74-2	Dibutyl phthalate (synonym = Di-n-Butyl Phthalate)	625	10.0	< 10 ug/l	G or C	1/5 YR
95-50-1	1,2-Dichlorobenzene	624	10.0	< 5.0 ug/l	G or C	1/5 YR
541-73-1	1,3-Dichlorobenzene	624	10.0	< 5.0 ug/l	G or C	1/5 YR
106-46-7	1,4-Dichlorobenzene	624	10.0	< 5.0 ug/l	G or C	1/5 YR
91-94-1	3,3-Dichlorobenzidine	(4)	(5)	< 10 ug/l	G or C	1/5 YR
84-66-2	Diethyl phthalate	625	10.0	< 10 ug/l	G or C	1/5 YR
117-81-7	Bis-2-ethylhexyl phthalate	625	10.0	< 10 ug/l	G or C	1/5 YR
131-11-3	Dimethyl phthalate	(4)	(5)	< 10 ug/l	G or C	1/5 YR
121-14-2	2,4-Dinitrotoluene	625	10.0	< 10 ug/l	G or C	1/5 YR
122-66-7	1,2-Diphenylhydrazine	(4)	(5)	< 10 ug/l	G or C	1/5 YR
206-44-0	Fluoranthene	625	10.0	< 10 ug/l	G or C	1/5 YR
86-73-7	Fluorene	625	10.0	< 10 ug/l	G or C	1/5 YR
118-74-1	Hexachlorobenzene	(4)	(5)	< 10 ug/l	G or C	1/5 YR
87-68-3	Hexachlorobutadiene	(4)	(5)	< 10 ug/l	G or C	1/5 YR
77-47-4	Hexachlorocyclopentadiene	(4)	(5)	< 10 ug/l	G or C	1/5 YR
67-72-1	Hexachloroethane	(4)	(5)	< 10 ug/l	G or C	1/5 YR
193-39-5	Indeno(1,2,3-cd)pyrene	625	20.0	< 10 ug/l	G or C	1/5 YR
78-59-1	Isophorone	625	10.0	< 10 ug/l	G or C	1/5 YR
98-95-3	Nitrobenzene	625	10.0	< 10 ug/l	G or C	1/5 YR
62-75-9	N-Nitrosodimethylamine	(4)	(5)	< 10 ug/l	G or C	1/5 YR
621-64-7	N-Nitrosodi-n-propylamine	(4)	(5)	< 10 ug/l	G or C	1/5 YR
86-30-6	N-Nitrosodiphenylamine	(4)	(5)	< 10 ug/l	G or C	1/5 YR
129-00-0	Pyrene	625	10.0	< 10 ug/l	G or C	1/5 YR
120-82-1	1,2,4-Trichlorobenzene	625	10.0	< 10 ug/l	G or C	1/5 YR
VOLATILES						
107-02-8	Acrolein	(4)	(5)	< 5.0 ug/l	G	1/5 YR
107-13-1	Acrylonitrile	(4)	(5)	< 5.0 ug/l	G	1/5 YR
71-43-2	Benzene	624	10.0	< 5.0 ug/l	G	1/5 YR
75-25-2	Bromoform	624	10.0	< 5.0 ug/l	G	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
56-23-5	Carbon Tetrachloride	624	10.0	< 5.0 ug/l	G	1/5 YR
108-90-7	Chlorobenzene (synonym = monochlorobenzene)	624	50.0	< 5.0 ug/l	G	1/5 YR
124-48-1	Chlorodibromomethane	624	10.0	< 5.0 ug/l	G	1/5 YR
67-66-3	Chloroform	624	10.0	< 5.0 ug/l	G	1/5 YR
75-09-2	Dichloromethane (synonym = methylene chloride)	624	20.0	< 5.0 ug/l	G	1/5 YR
75-27-4	Dichlorobromomethane	624	10.0	< 5.0 ug/l	G	1/5 YR
107-06-2	1,2-Dichloroethane	624	10.0	< 5.0 ug/l	G	1/5 YR
75-35-4	1,1-Dichloroethylene	624	10.0	< 5.0 ug/l	G	1/5 YR
156-60-5	1,2-trans-dichloroethylene	(4)	(5)	< 5.0 ug/l	G	1/5 YR
78-87-5	1,2-Dichloropropane	(4)	(5)	< 5.0 ug/l	G	1/5 YR
542-75-6	1,3-Dichloropropene	(4)	(5)	< 5.0 ug/l	G	1/5 YR
100-41-4	Ethylbenzene	624	10.0	< 5.0 ug/l	G	1/5 YR
74-83-9	Methyl Bromide	(4)	(5)	< 5.0 ug/l	G	1/5 YR
79-34-5	1,1,2,2-Tetrachloroethane	(4)	(5)	< 5.0 ug/l	G	1/5 YR
127-18-4	Tetrachloroethylene	624	10.0	< 5.0 ug/l	G	1/5 YR
10-88-3	Toluene	624	10.0	< 5.0 ug/l	G	1/5 YR
79-00-5	1,1,2-Trichloroethane	(4)	(5)	< 5.0 ug/l	G	1/5 YR
79-01-6	Trichloroethylene	624	10.0	< 5.0 ug/l	G	1/5 YR
75-01-4	Vinyl Chloride	624	10.0	< 5.0 ug/l	G	1/5 YR
RADIONUCLIDES						
	Uranium	(4)	(5)	0.00 +/- 0.00 pCi/L	G or C	1/5 YR
	Combined Radium 226 and 228	(4)	(5)	0.20 +/- 0.52 pCi/L	G or C	1/5 YR
	Beta Particle & Photon Activity (mrem/yr)	(4)	(5)	46.3 +/- 1.7 pCi/L	G or C	1/5 YR
	Gross Alpha Particle Activity (pCi/L)	(4)	(5)	1.3 +/- 1.3 pCi/L	G or C	1/5 YR
ACID EXTRACTABLES [6]						
95-57-8	2-Chlorophenol	625	10.0	<10 ug/l	G or C	1/5 YR
120-83-2	2,4 Dichlorophenol	625	10.0	<10 ug/l	G or C	1/5 YR
105-67-9	2,4 Dimethylphenol	625	10.0	<10 ug/l	G or C	1/5 YR
51-28-5	2,4-Dinitrophenol	(4)	(5)	<10 ug/l	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
534-52-1	2-Methyl-4,6-Dinitrophenol	(4)	(5)	<10 ug/l	G or C	1/5 YR
25154-52-3	Nonylphenol	(5)	(5)	<10 ug/l	G or C	1/5 YR
87-86-5	Pentachlorophenol	625	50.0	<10 ug/l	G or C	1/5 YR
108-95-2	Phenol	625	10.0	<10 ug/l	G or C	1/5 YR
88-06-2	2,4,6-Trichlorophenol	625	10.0	<10 ug/l	G or C	1/5 YR
MISCELLANEOUS						
776-41-7	Ammonia as NH3-N	350.1	200	0.79 mg/l	C	1/5 YR
16887-00-6	Chlorides	(4)	(5)	168.6 mg/l	C	1/5 YR
7782-50-5	Chlorine, Total Residual	(4)	100	< QL	G	1/5 YR
57-12-5	Cyanide, Free	(4)	10.0	< 0.01 mg/ l	G	1/5 YR
N/A	*E. coli / Enterococcus* (N/CML)	(4)	(5)	396.8 / 2.0 MPN/100ml	G	1/5 YR
7783-06-4	Hydrogen Sulfide	(5)	(5)	.40 mg/l	G	1/5 YR
60-10-5	Tributyltin [7]	NBSR 85-3295	(5)	< 30 ng/l	G or C	1/5 YR
	Hardness (mg/L as $CaCO_3$)	(4)	(5)	426 mg/l as $CaCo_3$	G or C (10)	1/5 YR

Tommy Waters, Complex Manager

Name of Principal Exec. Officer or Authorized Agent/Title

[signature], complex environmental mgr. 6/16/10

Signature of Principal Officer or Authorized Agent/Date

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations. See 18 U.S.C. Sec. 1001 and 33 U.S.C. Sec. 1319. (Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)

FOOTNOTES:

(1) Quantification level (QL) is defined as the lowest concentration used for the calibration of a measurement system when the calibration is in accordance with the procedures published for the required method.

The quantification levels indicated for the metals are actually Specific Target Values developed for this permit. The Specific Target Value is the approximate value that may initiate a wasteload allocation analysis. Target values are not wasteload allocations or effluent limitations. The Specific Target Values are subject to change based on additional information such as hardness data, receiving stream flow, and design flows.

Units for the quantification level are micrograms/liter unless otherwise specified.

Quality control and quality assurance information shall be submitted to document that the required quantification level has been attained.

(2) Sample Type

G = Grab = An individual sample collected in less than 15 minutes. Substances specified with "grab" sample type shall only be collected as grabs. The permittee may analyze multiple grabs and report the average results provided that the individual grab results are also reported. For grab metals samples, the individual samples shall be filtered and preserved immediately upon collection.

C = Composite = A 24-hour **(PW - Revise as required to require same composite duration as BOD_5)** composite unless otherwise specified. The composite shall be a combination of individual samples, taken proportional to flow, obtained at hourly or smaller time intervals. The individual samples may be of equal volume for flows that do not vary by +/- 10 percent over a 24-hour period.

(3) A specific analytical method is not specified; however a target value for each metal has been established. An appropriate method to meet the target value shall be selected from the following list of EPA methods (or any approved method presented in 40 CFR Part 136). If the test result is less than the method QL, a "<[QL]" shall be reported where the actual analytical test QL is substituted for [QL].

Metal	Analytical Method
Antimony	1638; 1639
Arsenic	206.5; 1632
Chromium[8]	1639
Cadmium	1637; 1638; 1639; 1640
Chromium VI	218.6; 1639
Copper	1638; 1640
Lead	1637; 1638; 1640
Mercury	245.7; 1631
Nickel	1638; 1639; 1640
Selenium	1638; 1639
Silver	1638
Zinc	1638; 1639

(4) Any approved method presented in 40 CFR Part 136.

(5) The QL is at the discretion of the permittee. For any substances addressed in 40 CFR Part 136, the permittee shall use one of the approved methods in 40 CFR Part 136.

(6) Testing for phenols requires continuous extraction.

(7) Analytical Methods: NBSR 85-3295 or DEQ's approved analysis for Tributyltin may also be used [See A Manual for the Analysis of Butyltins in Environmental Systems by the Virginia Institute of Marine Science, dated November 1996].

(8) Both Chromium III and Chromium VI may be measured by the total chromium analysis. If the result of the total chromium analysis is less than or equal to the lesser of the Chromium III or Chromium VI method QL, the results for both Chromium III and Chromium VI can be reported as "<[QL]", where the actual analytical test QL is substituted for [QL].

(9) The lab may use SW846 Method 8270D provided the lab has an Initial Demonstration of Capability, has passed a PT for Kepone, and meets the acceptance criteria for Kepone as given in Method 8270D

(10) The sample type for Hardness (as $CaCO_3$) shall match the sample type selected for Dissolved Metals.

DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY CRITERIA MONITORING
Additional Parameters (Pending Approval. . .)

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL[1]	REPORTING RESULTS	SAMPLE TYPE[2]	SAMPLE FREQUENCY
METALS						
7782-49-2	Selenium, Total Recoverable	(3)	(Insert target value)	**0.089 mg/l**	G or C	1/5 YR
PESTICIDES/PCB'S						
333-41-5	Diazinon	(5)	(5)	**< 1 ug/l**	G or C	1/5 YR
ACID EXTRACTABLES [6]						
25154-52-3	Nonylphenol	(5)	(5)	**< 10 ug/l**	G or C	1/5 YR

Tommy Waters, Complex Mgr

Name of Principal Exec. Officer or Authorized Agent/Title

Complex Environmental Mgr 6/16/10

Signature of Principal Officer or Authorized Agent/Date

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations. See 18 U.S.C. Sec. 1001 and 33 U.S.C. Sec. 1319. (Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)

FOOTNOTES:

(1) Quantification level (QL) is defined as the lowest concentration used for the calibration of a measurement system when the calibration is in accordance with the procedures published for the required method.

The quantification levels indicated for the metals are actually Specific Target Values developed for this permit. The Specific Target Value is the approximate value that may initiate a wasteload allocation analysis. Target values are not wasteload allocations or effluent limitations. The Specific Target Values are subject to change based on additional information such as hardness data, receiving stream flow, and design flows.

Units for the quantification level are micrograms/liter unless otherwise specified.

Quality control and quality assurance information shall be submitted to document that the required quantification level has been attained.

(2) Sample Type

G = Grab = An individual sample collected in less than 15 minutes. Substances specified with "grab" sample type shall only be collected as grabs. The permittee may analyze multiple grabs and report

the average results provided that the individual grab results are also reported. For grab metals samples, the individual samples shall be filtered and preserved immediately upon collection.

C = Composite = A 24-hour **(PW - Revise as required to require same composite duration as BOD_5)** composite unless otherwise specified. The composite shall be a combination of individual samples, taken proportional to flow, obtained at hourly or smaller time intervals. The individual samples may be of equal volume for flows that do not vary by +/- 10 percent over a 24-hour period.

(3) A specific analytical method is not specified; however a target value for each metal has been established. An appropriate method to meet the target value shall be selected from the following list of EPA methods (or any approved method presented in 40 CFR Part 136). If the test result is less than the method QL, a "<[QL]" shall be reported where the actual analytical test QL is substituted for [QL].

Metal	Analytical Method
Selenium	1638; 1639

(4) Any approved method presented in 40 CFR Part 136.

(5) The QL is at the discretion of the permittee. For any substances addressed in 40 CFR Part 136, the permittee shall use one of the approved methods in 40 CFR Part 136.

(6) Testing for phenols requires continuous extraction.

Outfall 001	Flow		pH		BOD_5			Total Suspended Solids (TSS)			
	(MGD)		(SU)		(kg/d)	(mg/L)		(kg/d)	(mg/L)		
Due Date	MO AVG	MAX	MIN	MAX	MO AVG	MO AVG	MAX	MO AVG	MO AVG	MAX	
10-Jun-2010	0.757	1.18	6.3	7.6	<QL	<QL	<QL	5.01	1.9	3.4	
10-Jul-2010	0.702	1.389	6.5	7.2	0.9	0.9	5.5	5.23	2.3	4.9	
10-Aug-2010	0.84	1.614	6.7	8.2	<QL	<QL	<QL	10.71	3.6	4.9	
10-Sep-2010	0.67	1.325	6.5	7.6	<QL	<QL	<QL	7.77	3	4.4	
10-Oct-2010	0.777	1.591	6.3	7.7	<QL	<QL	<QL	15.03	4.8	21.5	
10-Nov-10	0.793	1.969	6.1	7.6	<QL	<QL	<QL	6.46	2.1	4.9	
10-Dec-10	0.742	1.887	6.4	7.1	1.25	0.4	5.1	9.2	2.9	5	
10-Jan-11	0.822	1.743	6.1	8.9	10.13	3.1	6.4	16.31	5	6.1	
10-Feb-11	0.902	1.936	6.3	7.8	1.71	0.6	5.2	7.67	2.6	5.1	
10-Mar-11	0.735	1.304	6.6	7.6	<QL	<QL	<QL	8.93	3	4.6	
10-Apr-11	1.034	1.937	6.5	7.2	3.42	0.8	5.5	15.72	3.8	5.5	
10-May-11	0.857	1.543	6.4	8.5	1.96	0.5	5.6	15.58	4	5.5	
10-Jun-11	0.777	1.519	6.9	7.6	<QL	<QL	<QL	9.65	3	4.7	
10-Jul-11	0.696	1.998	7.1	8.9	<QL	<QL	<QL	8.5	3	6.2	
10-Aug-11	0.691	1.072	6.1	8.25	<QL	<QL	<QL	6.36	2.5	4.1	
10-Sep-11	0.798	1.275	6.3	7.8	<QL	<QL	<QL	8.99	2.6	5.4	
10-Oct-11	0.812	1.43	6.4	8	<QL	<QL	<QL	10.78	3.2	7	
10-Nov-11	0.752	1.511	6.2	7.5	3.07	0.877	5.7	6.47	2	4.8	
10-Dec-11	0.748	1.429	5.2	6.6	3.48	1.3	5.8	10.47	3.9	6.8	
10-Jan-12	0.841	2.69	5.17	7.5	3.68	1.1	6.8	7.55	2.3	4.8	
10-Feb-12	0.632	1.21	6.03	7.4	6.59	2.22	8.4	6.29	2.1	3.6	
10-Mar-12	0.822	2.209	6.57	7.17	4.09	1.21	4.8	6.01	1.78	3.2	
10-Apr-12	0.687	1.044	6.13	7.11	6.11	1.94	6.7	5.71	1.95	3	
10-May-12	0.563	0.852	6.03	7.4	0.84	0.41	4.9	3.29	1.34	2	
10-Jun-12	0.613	0.939	6.54	7.19	2.5	0.86	5.9	3.7	1.32	2.3	
10-Jul-12	0.53	0.854	6.98	7.39	1.2	0.65	8.4	2.69	1.34	2.5	
10-Aug-12	0.497	0.79	6.43	7.54	1.83	0.93	4.3	3.16	1.6	3.4	
10-Sep-12	0.542	0.795	7.01	7.62	<QL	<QL	<QL	4.7	2.19	4.6	
10-Oct-12	0.49	0.697	7.1	7.63	<QL	<QL	<QL	2.63	1.98	14.3	
10-Nov-12	0.494	0.782	6.48	7.68	<QL	<QL	<QL	2.45	1.32	11.9	
10-Dec-12	0.558	0.719	6.64	7.1	4.51	1.82	5.7	8.03	3.31	6.8	
10-Jan-13	0.529	0.746	6.52	7.17	1.03	0.47	2.9	4.3	1.68	7.3	
10-Feb-13	0.578	0.874	6.74	7.5	<QL	<QL	<QL	4.01	1.69	2.8	
10-Mar-13	0.64	1	6.43	7.14	<QL	<QL	<QL	3.89	1.48	3.9	

10-Apr-13	0.669	0.963	6.5	7.28	<QL	<QL	<QL	109.29	46.92	575	
10-May-13	0.644	0.932	6.39	7.08	<QL	<QL	<QL	5.26	1.93	4.2	
AVG	***0.701***	***1.326***	***6.41***	***7.57***	***1.6***	***0.6***	***2.9***	***10.2***	***3.8***	***21.4***	
90th percentile	***0.841***	***1.953***	***6.94***	***8.23***	***4.3***	***1.6***	***6.6***	***15.3***	***4.0***	***9.6***	
10th percentile	***0.530***	***0.786***	***6.07***	***7.11***	***<QL***	***<QL***	***<QL***	***3.2***	***1.4***	***2.9***	
Minimum	***0.490***	***0.697***	***5.17***	***6.60***	***<QL***	***<QL***	***<QL***	***2.5***	***1.3***	***2.0***	
Maximum	***1.034***	***2.690***	***7.10***	***8.90***	***10.1***	***3.1***	***8.4***	***109.3***	***46.9***	***575.0***	

	TRC		Fecal Coliform		DO	Total Photphorus (TP)					
	(µg/L)		(#/100ml)		(mg/L)	(kg/d)		(mg/L)		(kg/cal Y)	
	MO AVG	MAX	MO AVG	MAX	MIN	MO AVG	MAX	MO AVG	MAX	MAX	
	<QL	<QL	1	2	7.4	0.05	1.03	0.02	0.23	49	
	<QL	<QL	8	8	8.09	0.29	1.24	0.13	0.39	58	
	<QL	<QL	<QL	<QL	6.43	0.34	1.77	0.11	0.32	68	
	<QL	<QL	4.5	9	5.24	0.51	1.89	0.2	0.48	84	
	<QL	<QL	<QL	<QL	6.63	1.5	3.61	0.51	1.1	130	
	<QL	<QL	1.33	4	6.94	0.33	1.64	0.11	0.42	140	
	<QL	<QL	<QL	<QL	7.59	0.41	2	0.13	0.44	152	
	<QL	<QL	8	30	7.58	0.7	1.98	0.22	0.38	17.4	
	<QL	<QL	<QL	<QL	6.28	0.35	1.46	0.12	0.38	8	
	<QL	<QL	3.25	13	6.68	0.37	1.21	0.12	0.32	NA	
	<QL	<QL	1.2	4	7.23	1.08	1.39	0.25	0.497	33	
	<QL	<QL	1	2	6.84	1.02	2.9	0.26	0.43	57	
	<QL	<QL	1.5	4	6	0.92	2.32	0.29	0.49	86	
	<QL	<QL	28.8	90	5.62	0.69	2.19	0.24	0.47	104	
	<QL	<QL	9.5	17	5.47	0.16	1.23	0.06	0.31	108	
	<QL	<QL	121	300	7.9	0.2	0.9	0.06	0.19	113	
	<QL	<QL	36	140	7.56	0.83	1.92	0.24	0.47	138	
	<QL	<QL	0.5	2	6.11	0.7	0.93	0.12	0.21	150	
	<QL	<QL	40.8	130	7.46	0.5	1.84	0.18	0.34	163	
	1	16	5.67	17	8.17	0.7	1.95	0.21	0.49	181.9	
	<QL	<QL	87.5	350	6.26	0.42	0.71	0.14	0.19	13	
	<QL	<QL	34	170	8.61	0.77	1.86	0.22	0.31	35	
	<QL	<QL	2	4	8.05	0.62	1.5	0.23	0.47	54.41	
	<QL	<QL	2	4	8.04	0.2	0.33	0.08	0.13	60.44	
	<QL	<QL	<QL	<QL	7.73	0.2	0.35	0.08	0.11	67.06	
	<QL	<QL	1	2	7.79	0.36	0.67	0.17	0.3	77.65	
	<QL	<QL	<QL	<QL	7.21	0.4	0.69	0.2	0.29	90.13	
	<QL	<QL	<QL	<QL	6.74	0.44	0.71	0.21	0.4	103.64	
	<QL	<QL	<QL	<QL	6.69	0.44	0.77	0.24	0.79	116.75	
	<QL	<QL	<QL	<QL	7.03	0.41	1.25	0.2	0.75	129.33	
	<QL	<QL	<QL	<QL	7.29	0.28	0.56	0.12	0.22	137.85	
	<QL	<QL	22	22	5.25	0.18	0.34	0.07	0.14	143.38	
	<QL	<QL	<QL	<QL	6.53	0.3	0.55	0.13	0.2	9.21	
	<QL	<QL	<QL	<QL	9.25	0.58	0.87	0.23	0.34	24.64	

	<QL	<QL	<QL	<QL	8.71	0.61	0.95	0.22	0.34	43.49	
	<QL	<QL	<QL	<QL	8.04	0.37	0.55	0.15	0.28	54.54	
AVG	***0.03***	***0.44***	***12***	***37***	***7.12***	***0.51***	***1.34***	***0.17***	***0.38***	***85.7***	
90th percentile	***<QL***	***<QL***	***35***	***135***	***8.13***	***0.88***	***2.10***	***0.25***	***0.49***	***147.4***	
10th percentile	***<QL***	***<QL***	***<QL***	***<QL***	***5.81***	***0.20***	***0.55***	***0.08***	***0.19***	***20.3***	
Minimum	***<QL***	***<QL***	***<QL***	***<QL***	***5.24***	***0.05***	***0.33***	***0.02***	***0.11***	***8.0***	
Maximum	***1.00***	***16.00***	***121***	***350***	***9.25***	***1.50***	***3.61***	***0.51***	***1.10***	***181.9***	

	Total Nitrogen (TN)				Ammonia (NH_3)				TKN		
	(kg/d)		(mg/L)		(kg/d)		(mg/L)		(kg/d)	(mg/L)	
	MO AVG	MAX	MO AVG	MAX	MO AVG	MAX	MO AVG	MAX	MO AVG	MO AVG	
	7.86	15.72	2.32	4.64	1.98	5.94	0.7	1.33	1.64	1.34	
	4.9	9.8	2.92	4.84	1.64	4.01	0.7	1.26	0.53	0.66	
	12.16	14.36	3.54	3.59	5.25	32.22	1.8	5.76	2.24	1.46	
	21.97	37.58	11.06	19.62	2.54	15.88	1	4	0.85	0.84	
	107	131	36	43	1.21	1.85	0.4	0.54	<QL	<QL	
	43.47	84.76	15.36	30.1	<1.52	<1.95	<.5	<.5	0.35	0.25	
	17.68	32.85	5.77	12.6	2.24	10.9	0.7	2.41	6.18	1.93	
	9.93	21.78	3.12	6.6	4.61	18.16	1.4	3.51	5.71	2.28	
	10.73	17.03	3.87	6.18	2.06	5.93	0.7	1.55	2.1	0.73	
	17.67	25.32	5.75	6.92	<1.5	<1.9	<0.5	<0.5	4.64	1.48	
	12.21	27.41	2.44	4.2	3.82	36	0.9	4.91	8.44	1.54	
	20.59	45.12	4.7	8.89	4.12	18.97	1.1	5.69	5.51	1.37	
	17.68	5.42	5.42	13.23	5.64	21.53	1.8	4.54	2.95	1.14	
	18.28	43.05	6.33	12.5	2.87	24.73	1	4.54	5.04	1.85	
	3.97	8.9	1.94	4.38	2.26	12.3	0.9	3.1	1.44	0.84	
	32.35	45.85	9.85	11.97	<1.71	<2.14	<0.5	<0.5	2.29	0.65	
	24.03	30.31	7.48	8.96	<1.42	<2.06	<0.04	<0.5	4.12	1.66	
	29.93	43.09	8.65	10.79	<QL	<QL	<QL	<QL	1.05	0.47	
	23.23	43.27	6.59	11.56	0.51	5.63	0.2	1.04	4.14	1.02	
	20.24	36.27	6.12	11.56	0.69	9.252	0.2	2.31	1.5	0.8	
	8.46	42.32	7.09	14.75	0.08	0.22	<QL	0.06	4.59	2.55	
	17.192	31.168	5.932	9.17	0.204	0.932	0.053	0.18	2.302	0.78	
	18.94	32.24	6.38	10.25	0.11	0.37	0.04	0.2	1.48	0.5	
	20.76	29.4	8.14	10.86	0.06	0.15	0.03	0.09	0.73	0.28	
	21.53	28.81	7.4	9.42	0.08	0.5	0.03	0.2	<QL	<QL	
	20.36	21.68	7.79	8.3	0.08	0.46	0.04	0.18	1.96	0.75	
	13.75	15.34	7.23	9.32	0.03	0.07	0.02	0.03	0.64	0.3	
	9.1	10.28	5.57	6.2	0.03	0.06	0.02	0.03	1.01	0.62	
	12.73	14.96	6.02	6.47	<QL	<QL	<QL	<QL	1.91	0.91	
	19.82	21.51	9.65	10.92	<QL	<QL	<QL	<QL	1.56	0.78	
	15.61	17.17	7.46	7.83	<QL	<QL	<QL	<QL	1.95	0.97	
	25.02	28.08	10.23	11.7	<QL	<QL	<QL	<QL	2.62	1.07	
	21.97	23.08	9.64	11.57	1.87	10.82	0.72	3.96	1.61	0.67	
	21.42	24.29	9.55	10	1.19	11.62	0.35	3.07	<QL	<QL	

	23.92	29.01	8.58	10.5	0.27	0.3	0.1	0.1	0.45	0.16	
	18.56	20.08	6.98	7.6	0.26	0.35	0.1	0.1	1.33	0.5	
AVG	***20.70***	***30.79***	***7.58***	***10.86***	***1.44***	***7.14***	***0.46***	***1.57***	***2.36***	***0.92***	
90th percentile	***27.48***	***44.20***	***10.04***	***13.99***	***3.97***	***20.25***	***1.05***	***4.54***	***5.28***	***1.76***	
10th percentile	***8.78***	***12.32***	***3.02***	***4.74***	***<QL***	***<QL***	***<QL***	***<QL***	***0.40***	***0.21***	
Minimum	***3.97***	***5.42***	***1.94***	***3.59***	***<QL***	***<QL***	***<QL***	***<QL***	***<QL***	***<QL***	
Maximum	***107.00***	***131.00***	***36.00***	***43.00***	***5.64***	***36.00***	***1.80***	***5.76***	***8.44***	***2.55***	

	Settleable Solids		*E. coli*		Zinc, Total		Nitrate plus Nitrite				
	(ml/L)		Geometric Mean (n/100 ml)		(µg/L)		(kg/d)	(mg/L)			
	MO AVG	MAX	MO AVG	MAX	MO AVG	MAX	MO AVG	MO AVG			
	0.01	0.01	99.7	396.8	<QL	<QL	2.24	1.65			
	0.01	0.01	6.36	31.8	<QL	<QL	9.03	11.29			
	0.01	0.01	1.7	3.1	<QL	<QL	4.23	NULL			
	0.01	0.01	0.25	1	<QL	<QL	7.93	10.22			
	0.01	0.01	0.8	2	<QL	<QL	107	36			
	0.01	0.01	<QL	<QL	<QL	<QL	17.83	15.68			
	0.01	0.01	0.25	1	<QL	<QL	6.74	2.01			
	0.01	0.01	9.48	35.9	<QL	<QL	2.8	0.85			
	0.01	0.01	<QL	<QL	<QL	<QL	8.63	3.14			
	0.01	0.01	1.28	3.1	<QL	<QL	13.03	4.27			
	0.01	0.01	0.8	3	<QL	<QL	3.77	0.9			
	0.01	0.01	0.75	2	<QL	<QL	15.09	3.33			
	0.01	0.01	1.53	3.1	<QL	<QL	11.2	4.28			
	0.01	0.01	45.96	151.5	<QL	<QL	13.23	4.48			
	0.01	0.01	4.9	9.8	0.313	1.25	1.73	1.1			
	0.01	0.01	121	325	<QL	<QL	30.07	9.19			
	0.01	0.01	29.05	107	<QL	<QL	15.1	6.02			
	<QL	<QL	<QL	<QL	<QL	<QL	22.89	8.3			
	<QL	<QL	17.48	79.2	12	62	19.09	5.56			
	<QL	<QL	5.33	16	6.33	19	18.74	9.41			
	<QL	<QL	<QL	<QL	<QL	<QL	3.87	5.99			
	<QL	<QL	1	4	<QL	<QL	14.89	5.15			
	<QL	<QL	3	8	<QL	<QL	17.46	5.89			
	<QL	<QL	2	5	<QL	<QL	20.02	7.87			
	<QL	<QL	33	161	<QL	<QL	21.53	7.4			
	<QL	<QL	0.25	1	<QL	<QL	18.4	7.04			
	<QL	<QL	1	3	<QL	<QL	13.11	6.93			
	<QL	<QL	0.4	1	<QL	<QL	8.09	4.95			
	<QL	X	<QL	<QL	<QL	<QL	10.82	5.11			
	<QL	<QL	0.4	1	<QL	<QL	17.49	8.49			
	<QL	<QL	<QL	<QL	<QL	<QL	13.66	6.5			
	<QL	<QL	<QL	<QL	36	36	22.4	9.16			
	<QL	<QL	<QL	<QL	32.1	32.1	20.36	8.97			
	<QL	<QL	<QL	<QL	33.8	33.8	21.42	9.55			

	<QL	<QL	<QL	<QL	35.6	35.6	23.47	8.42			
	<QL	<QL	<QL	<QL	49.2	49.2	17.23	6.48			
AVG	***0.005***	***0.005***	***11***	***38***	***5.7***	***7.5***	***16.5***	***7.2***			
90th percentile	***0.01***	***0.01***	***31***	***129***	***33.0***	***34.7***	***22.6***	***10.0***			
10th percentile	***<QL***	***<QL***	***<QL***	***<QL***	***<QL***	***<QL***	***3.8***	***1.8***			
Minimum	***<QL***	***<QL***	***<QL***	***<QL***	***<QL***	***<QL***	***1.7***	***0.9***			
Maximum	***0.01***	***0.01***	***121***	***325***	***49.2***	***62.0***	***107.0***	***36.0***			

	Oil&Grease			
	(kg/d)		(mg/L)	
	MO AVG	MAX	MO AVG	MAX
	<QL	<QL	<QL	<QL
	<QL	<QL	<QL	<QL
	<QL	<QL	<QL	<QL
	<QL	<QL	<QL	<QL
	<QL	<QL	<QL	<QL
	<QL	<QL	<QL	<QL
	<QL	<QL	<QL	<QL
	<QL	<QL	<QL	<QL
	6.3	25.2	3.1	9.5
	16.68	30.92	7	10.5
	27.35	63.73	6.68	13.3
	33.39	64.97	10.13	12.8
	19.83	44.78	6.3	11.3
	<QL	<QL	<QL	<QL
	6.42	22.72	3.88	8.8
	7.32	29.83	2.68	8.2
	2.4	14.41	1.4	5.6
	<QL	<QL	<QL	<QL
	7.12	21.6	2.88	9
	<QL	<QL	<QL	<QL
	<QL	<QL	1.53	6.1
	3.87	19.35	1.42	7.1
	<QL	<QL	<QL	<QL
	<QL	<QL	<QL	<QL
	<QL	<QL	<QL	<QL
	7.45	29.82	2.85	11.4
	3.92	14.1	2.03	6.9
	3.71	18.57	1.42	7.1
	<QL	<QL	<QL	<QL
	1.79	8.97	1.08	5.4
	4.04	16.14	1.58	6.3
	<QL	<QL	<QL	<QL
	<QL	<QL	<QL	<QL
	<QL	<QL	<QL	<QL

	<QL	<QL	<QL	<QL
	<QL	<QL	<QL	<QL
AVG	***4.2***	***11.8***	***1.6***	***3.9***
90th percentile	***12.1***	***30.4***	***5.1***	***10.9***
10th percentile	***<QL***	***<QL***	***<QL***	***<QL***
Minimum	***<QL***	***<QL***	***<QL***	***<QL***
Maximum	***33.4***	***65.0***	***10.1***	***13.3***

Attachment F: MSTRANTI and Stats.exe

MSTRANTI DATA SOURCE REPORT

Stream information	
Mean Hardness	Same as effluent for discharge to dry ditch
90% Temperature (annual)	Same as effluent for discharge to dry ditch
90% Maximum pH	Same as effluent for discharge to dry ditch
10% Maximum pH	Same as effluent for discharge to dry ditch
Tier Designation	Tier Determination (Flow Frequency Memo)
Stream Flows	
All Data	Flow Frequency Memo (Fact Sheet Attachment A)
Mixing Information	
All Data	100% used for 0 MGD stream flows
Effluent Information	
Mean Hardness	Application –Water Quality Criteria Monitoring
90% Temperature (annual)	Application Form 2C
90% Maximum pH	DMR data
10% Maximum pH	DMR data
Discharge flow	Permit Application (Design Flow)

Data Location:

Attachment A: Flow Frequency Description
Attachment E: Facility Effluent Data (application and DMR data)

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Tyson Farms - Glen Allen Permit No.: VA0004031

Receiving Stream: Chickahominy River, UT Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information		
Mean Hardness (as CaCO3) =	426	mg/L	1Q10 (Annual) =	0	MGD	Annual - 1Q10 Mix =	100	%	Mean Hardness (as CaCO3) =	426	mg/L
90% Temperature (Annual) =	26.9	deg C	7Q10 (Annual) =	0	MGD	- 7Q10 Mix =	100	%	90% Temp (Annual) =	26.9	deg C
90% Temperature (Wet season) =	26.9	deg C	30Q10 (Annual) =	0	MGD	- 30Q10 Mix =	100	%	90% Temp (Wet season) =	26.9	deg C
90% Maximum pH =	8.23	SU	1O10 (Wet season) =	0	MGD	Wet Season - 1Q10 Mix =	100	%	90% Maximum pH =	8.23	SU
10% Maximum pH =	7.11	SU	30O10 (Wet season)	0	MGD	- 30Q10 Mix =	100	%	10% Maximum pH =	7.11	SU
Tier Designation (1 or 2) =	1		30Q5 =	0	MGD				Discharge Flow =	1.25	MGD
Public Water Supply (PWS) Y/N? =	n		Harmonic Mean =	0	MGD						
Trout Present Y/N? =	n										
Early Life Stages Present Y/N? =	y										

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	9.9E+02	--	--	--	--	--	--	--	--	--	--	na	9.9E+02
Acrolein	0	--	--	na	9.3E+00	--	--	na	9.3E+00	--	--	--	--	--	--	--	--	--	--	na	9.3E+00
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	2.5E+00	--	--	--	--	--	--	--	--	--	--	na	2.5E+00
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	3.0E+00	--	na	5.0E-04	--	--	--	--	--	--	--	--	3.0E+00	--	na	5.0E-04
Ammonia-N (mg/l) (Yearly)	0	5.40E+00	7.69E-01	na	--	5.40E+00	7.69E-01	na	--	--	--	--	--	--	--	--	--	5.40E+00	7.69E-01	na	--
Ammonia-N (mg/l) (High Flow)	0	5.40E+00	7.69E-01	na	--	5.40E+00	7.69E-01	na	--	--	--	--	--	--	--	--	--	5.40E+00	7.69E-01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	4.0E+04	--	--	--	--	--	--	--	--	--	--	na	4.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	6.4E+02	--	--	--	--	--	--	--	--	--	--	na	6.4E+02
Arsenic	o	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	--	--	na	5.1E+02
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	2.0E-03	--	--	--	--	--	--	--	--	--	--	na	2.0E-03
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	5.3E+00	--	--	--	--	--	--	--	--	--	--	na	5.3E+00
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	6.5E+04	--	--	--	--	--	--	--	--	--	--	na	6.5E+04
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	2.2E+01	--	--	--	--	--	--	--	--	--	--	na	2.2E+01
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
Cadmium	0	1.9E+01	3.4E+00	na	--	1.9E+01	3.4E+00	na	--	--	--	--	--	--	--	--	--	1.9E+01	3.4E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	1.6E+01	--	--	--	--	--	--	--	--	--	--	na	1.6E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	2.4E+00	4.3E-03	na	8.1E-03	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	na	8.1E-03
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+02**
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+04**
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+03**
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	**8.3E-02**	**4.1E-02**	**na**	**--**
Chromium III	0	1.8E+03	2.3E+02	na	--	1.8E+03	2.3E+02	na	--	--	--	--	--	--	--	--	--	**1.8E+03**	**2.3E+02**	**na**	**--**
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	**1.6E+01**	**1.1E+01**	**na**	**--**
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	1.8E-02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E-02**
Copper	0	5.0E+01	2.9E+01	na	--	5.0E+01	2.9E+01	na	--	--	--	--	--	--	--	--	--	**5.0E+01**	**2.9E+01**	**na**	**--**
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	5.2E+00	na	1.6E+04	--	--	--	--	--	--	--	--	**2.2E+01**	**5.2E+00**	**na**	**1.6E+04**
DDD [C]	0	--	--	na	3.1E-03	--	--	na	3.1E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.1E-03**
DDE [C]	0	--	--	na	2.2E-03	--	--	na	2.2E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E-03**
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	1.0E-03	na	2.2E-03	--	--	--	--	--	--	--	--	**1.1E+00**	**1.0E-03**	**na**	**2.2E-03**
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	**--**	**1.0E-01**	**na**	**--**
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	1.7E-01	na	--	--	--	--	--	--	--	--	--	**1.7E-01**	**1.7E-01**	**na**	**--**
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E-01**
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.3E+03**
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	9.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.6E+02**
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.9E+02**
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	2.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.8E-01**
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	1.7E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E+02**
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	3.7E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.7E+02**
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	7.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.1E+03**
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.0E+04**
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	2.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.9E+02**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+02**
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	2.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.1E+02**
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	2.4E-01	5.6E-02	na	5.4E-04	--	--	--	--	--	--	--	--	**2.4E-01**	**5.6E-02**	**na**	**5.4E-04**
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	4.4E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.4E+04**
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	8.5E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.5E+02**
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.1E+06	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+06**
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	4.5E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.5E+03**
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	5.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.3E+03**
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.8E+02**
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	3.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.4E+01**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	5.1E-08	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E-08**
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	2.0E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.0E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	8.9E+01	--	--	--	--	--	--	--	--	**2.2E-01**	**5.6E-02**	**na**	**8.9E+01**
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	8.9E+01	--	--	--	--	--	--	--	--	**2.2E-01**	**5.6E-02**	**na**	**8.9E+01**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	--	--	--	--	--	--	--	--	**2.2E-01**	**5.6E-02**	**--**	**--**
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.9E+01**
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.6E-02	3.6E-02	na	6.0E-02	--	--	--	--	--	--	--	--	**8.6E-02**	**3.6E-02**	**na**	**6.0E-02**
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	3.0E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E-01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.1E+03**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.4E+02**
Fluorene	0	--	--	na	5.3E+03	--	--	na	5.3E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.3E+03**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	**--**	**1.0E-02**	**na**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	5.2E-01	3.8E-03	na	7.9E-04	--	--	--	--	--	--	--	--	**5.2E-01**	**3.8E-03**	**na**	**7.9E-04**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	5.2E-01	3.8E-03	na	3.9E-04	--	--	--	--	--	--	--	--	**5.2E-01**	**3.8E-03**	**na**	**3.9E-04**
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	2.9E-03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.9E-03**
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E+02**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	4.9E-02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.9E-02**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	1.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.7E-01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	9.5E-01	--	na	1.8E+00	--	--	--	--	--	--	--	--	**9.5E-01**	**--**	**na**	**1.8E+00**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.1E+03**
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.3E+01**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**2.0E+00**	**na**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.8E-01**
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	9.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**9.6E+03**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Lead	0	6.9E+02	7.9E+01	na	--	6.9E+02	7.9E+01	na	--	--	--	--	--	--	--	--	--	**6.9E+02**	**7.9E+01**	**na**	**--**
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	**--**	**1.0E-01**	**na**	**--**
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.4E+00	7.7E-01	- -	- -	--	--	--	--	--	--	--	--	**1.4E+00**	**7.7E-01**	**- -**	**- -**
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.5E+03**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	5.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.9E+03**
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	**--**	**3.0E-02**	**na**	**--**
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	**--**	**0.0E+00**	**na**	**--**
Nickel	0	5.9E+02	6.5E+01	na	4.6E+03	5.9E+02	6.5E+01	na	4.6E+03	--	--	--	--	--	--	--	--	**5.9E+02**	**6.5E+01**	**na**	**4.6E+03**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	6.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.9E+02**
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	3.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E+01**
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.0E+01**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	5.1E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.1E+00**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.6E+00	na	--	--	--	--	--	--	--	--	--	**2.8E+01**	**6.6E+00**	**na**	**--**
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	**6.5E-02**	**1.3E-02**	**na**	**--**
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	1.4E-02	na	6.4E-04	--	--	--	--	--	--	--	--	**--**	**1.4E-02**	**na**	**6.4E-04**
Pentachlorophenol [C]	0	9.7E+00	7.5E+00	na	3.0E+01	9.7E+00	7.5E+00	na	3.0E+01	--	--	--	--	--	--	--	--	**9.7E+00**	**7.5E+00**	**na**	**3.0E+01**
Phenol	0	--	--	na	8.6E+05	--	--	na	8.6E+05	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**8.6E+05**
Pyrene	0	--	--	na	4.0E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+03**
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	5.0E+00	na	4.2E+03	--	--	--	--	--	--	--	--	**2.0E+01**	**5.0E+00**	**na**	**4.2E+03**
Silver	0	3.7E+01	--	na	--	3.7E+01	--	na	--	--	--	--	--	--	--	--	--	**3.7E+01**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.0E+01**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.3E+01**
Thallium	0	--	--	na	4.7E-01	--	--	na	4.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.7E-01**
Toluene	0	--	--	na	6.0E+03	--	--	na	6.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.0E+03**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	7.3E-01	2.0E-04	na	2.8E-03	--	--	--	--	--	--	--	--	**7.3E-01**	**2.0E-04**	**na**	**2.8E-03**
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.6E-01	7.2E-02	na	--	--	--	--	--	--	--	--	--	**4.6E-01**	**7.2E-02**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	7.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.0E+01**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**1.6E+02**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.0E+02**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.4E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.4E+01**
Zinc	0	3.8E+02	3.8E+02	na	2.6E+04	3.8E+02	3.8E+02	na	2.6E+04	--	--	--	--	--	--	--	--	**3.8E+02**	**3.8E+02**	**na**	**2.6E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	6.4E+02
Arsenic	9.0E+01
Barium	na
Cadmium	2.0E+00
Chromium III	1.4E+02
Chromium VI	6.4E+00
Copper	1.8E+01
Iron	na
Lead	4.7E+01
Manganese	na
Mercury	4.6E-01
Nickel	3.9E+01
Selenium	3.0E+00
Silver	1.5E+01
Zinc	1.5E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Stats.exe Results

Facility = Tyson Farms
Chemical = Ammonia, mg/L
Chronic averaging period = 30
WLAa = 5.4
WLAc = 0.769
Q.L. = .2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 10
Expected Value = .146259
Variance = .007701
C.V. = 0.6
97th percentile daily values = .355910
97th percentile 4 day average = .243344
97th percentile 30 day average= .176396
< Q.L. = 8
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are (mg/L):
0.1
0.1
0.35
0.72
0.02
0.02
0.04
0.03
0.03
0.04

Based on the data submitted with the application And DMRs, no limit is required for this parameter.

Facility = Tyson Farms
Chemical = Chloride, mg/L
Chronic averaging period = 4
WLAa = 860
WLAc = 230
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3
Expected Value = 149.533
Variance = 8049.67
C.V. = 0.6
97th percentile daily values = 363.877
97th percentile 4 day average = 248.792
97th percentile 30 day average= 180.345
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data
A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 336.392200332243
Average Weekly limit = 336.392200332243
Average Monthly Limit = 336.392200332243

The data are (mg/L):
168.6
150
130

Based on data submitted with the application, a new chloride limit is required based on chronic toxicity. However, because the limit is triggered with a limited set of data, and all data is below the WLAs, no limit is applied at this time. Monthly monitoring will be required over the course of the permit term and reasonable potential will be evaluated at the next reissuance.

Facility = Tyson Farms
Chemical = Hydrogen Sulfide, µg/L
Chronic averaging period = 4
WLAa =
WLAc = 2
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 400
Variance = 57600
C.V. = 0.6
97th percentile daily values = 973.367
97th percentile 4 day average = 665.516
97th percentile 30 day average= 482.421
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data
A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 2.92514956810646
Average Weekly limit = 2.92514956810646
Average Monthly Limit = 2.92514956810646

The data are:
400 µg/L

A reasonable potential analysis was performed using hydrogen sulfide data reported on the permit application. Based on this analysis, a limit is needed. However, because the permittee has demonstrated that detections of this parameters derived from sampling errors, and subsequent sampling was undetected, no further sampling for this parameter will be required.

Facility = Tyson Farms
Chemical = Zinc, dissolved, µg/L
Chronic averaging period = 4
WLAa = 380
WLAc = 380
Q.L. = 2.9
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3

Expected Value = 92.0333
Variance = 3049.24
C.V. = 0.6
97th percentile daily values = 223.955
97th percentile 4 day average = 153.124
97th percentile 30 day average= 110.997
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are (µg/L):

190
36.3
49.8

A reasonable potential analysis was performed using the existing limit and two additional data provided in March 25, 2015. No limitation is required for this parameter. The limitation included in the 2005 permit will be carried forward to the 2015 permit to avoid antibacksliding.

Facility = Tyson Farms
Chemical = Cadmium, dissolved
Chronic averaging period = 4
WLAa = 19
WLAc = 3.4
Q.L. = 0.3
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 3

Expected Value = .278324
Variance = .027887
C.V. = 0.6
97th percentile daily values = .677280
97th percentile 4 day average = .463073
97th percentile 30 day average= .335674
< Q.L. = 0
Model used = BPJ Assumptions, type 1 data

No limit is required for this material

The data are (µg/L):

3
0
0

A reasonable potential analysis was performed for cadmium, which was reported as < 3.0 µg/L on the reissuance application. The agency accepted QL for cadmium as 0.3 µg/L. Therefore, for the purpose of this evaluation cadmium was considered present at a concentration equal to the lab QL of 3 µg/L. The data provided in the March 25, 2015 report were below the agency QL, and are reported above as 0.

Attachment G: Groundwater Evaluation

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4949-A Cox Road, Glen Allen, VA 23060-6296 **804/527-5020**

SUBJECT: Tyson Foods, Inc. - Groundwater Evaluation

TO: File

FROM: Janine Howard

DATE: January 27, 2014

Process and Background:
Tyson Foods, Inc. located on Mountain Road in Hanover County is a poultry processing plant, involving slaughter, cut-up, and packaging for human consumption as well as poultry processing for pet food production. The facility is permitted as a minor industrial discharger. The discharge results from the operation of a 1.5 million gallon per day wastewater treatment plant. Components of the treatment system include screening, acidulation, extended aeration, an activated sludge basin with suspended growth for ammonia removal, a four-stage Bardenpho system for biological nutrient removal, tertiary filtering, and ultraviolet disinfection.

Groundwater Monitoring:
There are four monitoring wells on site that are actively sampled (see attached groundwater contour map). Groundwater flows east through the property. MW-1 is the background well and is located north of the processing plant. MW-2, MW-3, and MW-4 are the downgradient wells that were put in place to monitor the groundwater impacts of the original treatment lagoons on site. The lagoons were constructed in 1968 east of the processing plant using on-site soils and were not lined. During the early 1990's groundwater contamination down-gradient of the treatment lagoons was observed in MW-2, MW-3, and MW-4. On April 4, 1992 a Lagoon Closure Plan (see attached) was submitted to and approved by DEQ. The plan involved a groundwater recovery network of wells used to remove contaminated groundwater from the area in addition to draining, sludge volume reduction and eventual revegetation of the lagoons.

The groundwater monitoring plan approved in 1990 requires quarterly groundwater monitoring. Additionally, indefinite quarterly monitoring of the wells was deemed necessary in the January 9, 1992 approval letter for the groundwater remediation plan for the facility. With the closure of the lagoons in 1992, natural attenuation of the contaminant levels in the groundwater is expected to occur over time until the groundwater meets standards.

Quarterly groundwater data was used for this evaluation, derived from sampling events from 2005-2013. See the contour map following this report which includes the approximate locations of all monitoring wells.

The parameters assessed are ammonia-N, biochemical oxygen demand (BOD), chloride, chemical oxygen demand (COD), nitrite, nitrate, sulfate, total dissolved solids (TDS), total kjeldahl nitrogen (TKN), pH, specific conductance, copper, sodium, and zinc. The data were evaluated for normality using the DEQ Piedmont Regional Office, Groundwater Analysis Spreadsheet which employs the Shapiro- Wilk Test of Normality. Non-normal data were assessed using a non-parametric test of significance (Wilcoxon Rank Sum Test), while normal data was assessed for a

significant difference using Cochran's approximation to the Behrens-Fisher Student's t-test with a 5% level of significance. The statewide groundwater standards applicable to this facility are listed in Table I. The facility falls in the Piedmont and Blue Ridge Physiographic Province for which there are also some specific standards and criteria. The results of the tests of significance are summarized in Table II below.

Table I. Groundwater criteria and individual monitoring well averages.

Parameter	**Standard or Criteria**	**MW-1 (background)**	**MW-2**	**MW-3**	**MW-4**
Chloride (mg/L)	25 (3)	3.0	38	54	48
Nitrate (mg/L)	5 (2)	0.15	0.057	0.097	0.062
Nitrite (mg/L)	0.025 (2)	0.012	0.007	0.012	0.012
TKN (mg/L)	No standard/ criteria	1.266	2.545	77.7	10.1
Ammonia (mg/L)	0.025 (2)	0.012	1.2	66	8
Zinc (mg/L)	0.05 (1)	0.01	0.029	0.023	0.021
Copper (mg/L)	1.0 (1)	0.011	0.010	0.016	0.011
BOD	No standard/ criteria	1.35	5.33	7.48	8.05
COD	No standard/ criteria	15.68	32.57	72.01	51.54
Sulfate (mg/L)	25 (3)	4.0	34	12	6.5
TDS (mg/L)	250 (3)	41.4	278	480	379
Sodium (mg/L)	270 (1) 25 (3)	3.8	48	79	65
Conductivity (umhos/cm)	No standard/ criteria	83.42	447.4	1042	493.2
pH (SU)	5.5 - 8.5 (3)	Min 4.9 Max 9.2	Min 5.7 Max 7.3	Min 5.8 Max 8.4	Min 5.6 Max 7.8

(1) Groundwater standards applicable statewide (9 VAC 25-280-40)
(2)Groundwater standards for the Piedmont & Blue Ridge Physiographic province (9 VAC 25-280-50)
(3) Groundwater criteria for the Piedmont & Blue Ridge Physiographic province (9 VAC 25-280-70)

Table II. Statistical difference between upgradient well (MW-1) and downgradient wells

Monitoring Well	**Chloride**	**Nitrate**	**Nitrite**	**TKN**	**NH4**	**Zinc**	**Copper**	**BOD**	**COD**	**Sulfate**	**TDS**	**pH**	**Sodium**	**Sp. Cond**
MW-2	S	NS	NS	S	S	S	NS	S	S	S	S	NS	S	S
MW-3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	S	NS	S
MW-4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	S	S	S

S= significant difference, NS= not significant

Chloride:
Statistical analysis of the chloride data indicated a significant difference in concentration at one of the three downgradient wells. Additionally, the majority of the data collected at the downgradient wells is above the groundwater criteria of 25 mg/L. Linear trends suggest a slight decrease in the

concentrations found at the downgradient MW-2 and MW-3 wells overall. MW-4 exhibits a slight positive trend.

Nitrate:
Downgradient nitrate concentrations were not significantly different from the background well. There are no exceedances of the groundwater standard documented in the groundwater data collected at MW-1, MW-2, MW-3, or MW-4 between March 2005 and February 2013.

Nitrite:
Downgradient nitrite concentrations were not statistically significantly different in the downgradient wells as compared to the upgradient well. There was a single exceedance of the 0.025 mg/L groundwater standard in MW-2 but the remainder of the data collected at all downgradient wells were below the standard.

TKN:
TKN does not have a groundwater standard or criteria. Each of the downgradient wells show elevated concentrations of TKN as compared to MW-1. The average TKN concentration at the upgradient well was 1.26 mg/L while MW-2, MW-3, and MW-4 had average concentrations of 2.54 mg/L, 77.7 mg/L, and 10 mg/L respectively. Overall the regression analysis indicates a weak negative trend in TKN levels at MW-1 and MW-3 and a weak positive trend at MW-2 and MW-4.

Ammonia:
Ammonia concentrations are considerably elevated above the groundwater standard at all of the downgradient wells. MW-2 and MW-3 exhibit a very weak upward trend, while MW-4 has a moderate negative trend.

Zinc:
Zinc concentrations at MW-2 are statistically significantly greater than concentrations found at MW-1, the ambient well. However, the concentrations exhibit a decreasing trend and are below the standard with the exception of one data point. Zinc concentrations at MW-3 and MW-4 are also decreasing and are not significantly different from MW-1. The majority of the datapoints at MW-3 and MW-4 are below the standard.

Copper:
The data indicate no exceedances of the copper groundwater standard at any of the wells. Additionally, the concentrations at the downgradient wells are not significantly greater than those at the upgradient well.

BOD:
BOD does not have a groundwater standard or criterion. The BOD concentration data at the downgradient wells show a weak decreasing trend and with the exception of MW-2, there is no significant difference in the downgradient concentrations.

COD:
COD does not have a groundwater standard or criterion. There is no indication of contamination at MW-3 and MW-4. MW-2 does display a weak increasing trend in the COD concentrations in addition to the data being significantly different from that at MW-1.

Sulfate:
The sulfate criterion for this facility is 25 mg/L. Seventeen of the nineteen datapoints at MW-2 are greater than the criterion, an indication of contamination. Additionally the data at MW-2 is significantly greater than that at MW-1. The difference between sulfate concentrations at the upgradient well and MW-3 and MW-4 is not significant. The majority of datapoints collected at MW-3 and MW-4 are well below the standard. There is a strong positive trend in concentrations at MW-2 and a slight increasing trend at MW-3.

TDS:
TDS concentrations in MW-2 are significantly elevated as compared to MW-1. TDS concentrations at MW-3 and MW-4 are not significantly different from those at MW-1.Most of the downgradient data is in excess of the 250 mg/L standard. The downgradient wells show moderate increasing trends in TDS concentrations, though the same trend is apparent at the upgradient well.

Sodium:
Sodium concentrations at the downgradient wells are all in excess of the criterion of 25 mg/L with the exception of one data point collected at MW-2. However, the concentrations do not exceed the statewide standard of 270 mg/L. Sodium concentrations at the background well are consistently below the criterion. MW-2 and MW-4 exhibit slight positive trends in sodium concentrations over time. MW-2 and MW-4 data is statistically significantly different than that at MW-1.

pH:
Downgradient pH levels show no significant elevations as compared to MW-1. Additionally, there are no excursions from the criterion at the downgradient wells.

Specific Conductance:
There is no groundwater criterion for specific conductance, however the parameter is an indicator of ions in the groundwater and is suggestive of the presence of other pollutants such as chlorides, nitrates, phosphates and sodium. As such, increased specific conductivity values are expected at wells where other parameters have been noted at elevated concentrations. All downgradient wells show significant elevations relative to MW-1. The regression analysis indicates a moderate decreasing trend in the conductance at MW-1, MW-2, and MW-4.

Conclusion:
The greatest level of impact relative to the up-gradient well appears to be at MW-2. MW-2 is located directly east of the former wastewater lagoons so this is to be expected. In general, ammonia, chlorides, BOD/COD, TDS, and sulfate appear to be the parameters of greatest concern. Concentrations of these pollutants are either present at levels greater than the standard/criterion or are found in concentrations in the downgradient wells that are statistically significantly greater than that at the up-gradient well. That being said, increasing trends in pollutant levels at the downgradient wells are weak and nonexistent in many instances. In some cases the pollutant levels are stagnant or may be decreasing slightly. The source of the contamination, the wastewater lagoons, have been closed and reclaimed. As such, it is anticipated that the groundwater contamination will naturally attenuate over time.

Certain parameters are consistently below the groundwater standard/criterion at the down-gradient wells. This is the case for nitrates, nitrites, zinc, and copper. The concentration of these parameters is also not significantly greater at the down-gradient wells (with the exception of zinc at MW-2).

Recommendation:
The lagoon closure plan approved in 1992 relies on removal of the source of contamination, groundwater remediation (pumping and treatment for one year following approval) and long term groundwater monitoring. Natural attenuation of the groundwater is expected over time. The greatest contamination is apparent in MW-2 which is located in closest proximity to the wastewater lagoons. MW-3 and MW-4 located west of the lagoons do not exhibit the same level of groundwater contamination, suggesting that the plume is localized.

Based on this evaluation it appears that contamination is still present for certain parameters but that some of the presently monitored parameters are no longer impacting the groundwater at the site. Since the facility is operating under a monitoring plan that is over 20 years old and may no

longer appropriately target groundwater concerns on the site, staff recommends a revised groundwater monitoring plan be developed. A revised groundwater monitoring plan may be incorporated into the permit via a special condition that requires submission of a revised plan within a certain timeframe following the permit reissuance.

Appendix- Data, Figures, and Tables

1) Groundwater Contour Map

2) Groundwater Monitoring Data Analysis for:

- Chloride
- Nitrate
- Nitrite
- TKN
- Ammonia
- Zinc
- Copper
- BOD_5
- COD
- Sulfate
- TDS
- Sodium
- Specific Conductance
- pH

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	Chloride
Applicable GW Standard (if none leave	
Applicable GW Criteria (if none leave blank):	25
Concentration Units (all data):	mg/L

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	3/2/2005	3	38	76	21	43	
2	11/1/2005	3	38	74	35	28	
3	2/28/2006	3	39	69	44	14	
4	4/27/2006	3	34	65	41	12	
5	7/3/2006	3	37	63	46	7	
6	10/13/2006	4	47	71	50	5	
7	2/9/2007	3	40	79	50	36	
8	5/2/2007	2	37	40	55	41	
9	7/26/2007	2	37	59	47	47	
10	10/15/2007	2	38	60	49	50	
11	1/28/2008	2.6	37.2	56.2	51.5	34.8	
12	4/25/2008	3	38.9	54.2	50.2	34.5	
13	8/11/2008	2.6	39.4	0.1	49.9	34.4	
14	1/15/2009	2.9	38.1	54.3	45.7	25.7	
15	4/9/2009	2.9	39.5	58.1	49.6	33.4	
16	9/2/2009	4.62	38.8	57.2	48.9	26.3	
17	10/16/2009	2.8	38.3	55.4	49.9	25.8	
18	1/14/2010	2.4	38.1	56.2	50.5	39.3	
19	7/14/2010	2.4	35.6	5.8	49.2	39.7	
20	8/16/2010	2.4		49	57	24.5	
21	10/28/2010	3.9		55.5	54.5	24.4	
22	3/15/2011	2.7		53.9	49.4	38.8	
23	6/21/2011	2.8		3.3	1.9	37.2	
24	9/19/2011	2.3		56.4	52.2	30.3	
25	12/13/2011	5.2		60.3	56.1	37.7	
26	2/22/2012	2.4		60.7	58.1		
27	9/12/2012	2.2		60.4	53.9		
28	12/6/2012	2.1		59.8	54.2		
29	2/19/2013	7.1		66.8	61.5		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Significant	Significant	Significant
MW3	Compliance Well #2	Not normal	Not normal	Not Significant	Significant	Significant
MW4	Compliance Well #3	Not normal	Not normal	Not Significant	Significant	Significant
CB	Compliance Well #4	Normal	Not normal	Significant	Significant	Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	0.000258756	0.204365873	Slight Increase	Very Weak
MW2	Compliance Well #1	-0.00033963	-0.076523718	Slight Decrease	Very Weak
MW3	Compliance Well #2	-0.006313803	-0.277206233	Slight Decrease	Moderately Weak
MW4	Compliance Well #3	0.004418996	0.327060649	Slight Increase	Moderately Weak
CB	Compliance Well #4	0.003978796	0.250589568	Slight Increase	Moderately Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well			0	0%	29
MW2	Compliance Well #1			19	100%	19
MW3	Compliance Well #2			26	89.7%	29
MW4	Compliance Well #3			27	93.1%	29
CB	Compliance Well #4			19	76%	25
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	7.100	2.000	3.011		
MW2	Compliance Well #1	47.000	34.000	38.363		
MW3	Compliance Well #2	79.000	0.100	54.469		
MW4	Compliance Well #3	61.500	1.900	47.662		
CB	Compliance Well #4	50.000	5.000	30.792		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	Nitrate
Applicable GW Standard (if none leave	5
Applicable GW Criteria (if none leave blank):	
Concentration Units (all data):	mg/L

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	3/2/2005	0.21	0.19	0.01	0.01	1.5	
2	11/1/2005	0.14	0.01	0.01	0.01	6.44	
3	2/28/2006	0.01	0.01	0.01	0.01	0.01	
4	4/27/2006	0.13	0.08	0.01	0.01	4.54	
5	7/3/2006	0.13	0.01	0.05	0.01	2.32	
6	10/13/2006	0.14	0.01	0.05	0.05	0.59	
7	2/9/2007	0.14	0.03	0.03	0.04	2.96	
8	5/2/2007	0.18	0.16	0.06	0.06	3.5	
9	7/26/2007	0.13	0.01	0.06	0.04	2.55	
10	10/15/2007	0.11	0.01	0.08	0.05	1.88	
11	1/28/2008	0.21	0.02	0.02	0.04	5.62	
12	4/25/2008	0.19	0.22	0.04	0.07	1.31	
13	8/11/2008	0.13	0.02	0.01	0.09	1.81	
14	1/15/2009	0.13	0.02	0.06	0.03	3.71	
15	4/9/2009	0.58	0.06	0.01	0.04	5.02	
16	9/2/2009	0.05	0.02	0.08	0.03	6.18	
17	10/16/2009	0.14	0.02	0.53	0.27	10.5	
18	1/14/2010	0.13	0.04	0.03	0.04	2.89	
19	7/14/2010	0.21	0.14	0.02	0.05	3.32	
20	8/16/2010	0.11		0.05	0.06	6.42	
21	10/28/2010	0.09		0.05	0.14	3.3	
22	3/15/2011	0.12		0.01	0.01	2.37	
23	6/21/2011	0.2		0.04	0.03	3.06	
24	9/19/2011	0.11		0.07	0.03	3.9	
25	12/13/2011	0.12		0.32	0.19	3.28	
26	2/22/2012	0.12		0.1	0.1		
27	9/12/2012	0.2		0.1	0.1		
28	12/6/2012	0.1		0.2	0.1		
29	2/19/2013	0.1		0.7	0.1		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Not Significant	Not Significant	Not Significant
MW3	Compliance Well #2	Not normal	Not normal	Not Significant	Not Significant	Not Significant
MW4	Compliance Well #3	Not normal	Not normal	Not Significant	Not Significant	Not Significant
CB	Compliance Well #4	Normal	Not normal	Not Significant	Significant	Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	-3.93487E-06	-0.035569169	Slight Decrease	Very Weak
MW2	Compliance Well #1	-4.72733E-06	-0.039492032	Slight Decrease	Very Weak
MW3	Compliance Well #2	8.60636E-05	0.464508052	Slight Increase	Moderately Weak
MW4	Compliance Well #3	3.19044E-05	0.468124407	Slight Increase	Moderately Weak
CB	Compliance Well #4	0.000781627	0.256960528	Slight Increase	Moderately Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well	0	0%			29
MW2	Compliance Well #1	0	0%			19
MW3	Compliance Well #2	0	0%			29
MW4	Compliance Well #3	0	0%			29
CB	Compliance Well #4	6	24%			25
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	0.580	0.010	0.150		
MW2	Compliance Well #1	0.220	0.010	0.057		
MW3	Compliance Well #2	0.700	0.010	0.097		
MW4	Compliance Well #3	0.270	0.010	0.062		
CB	Compliance Well #4	10.500	0.010	3.559		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	Nitrite
Applicable GW Standard (if none leave	0.025
Applicable GW Criteria (if none leave blank):	
Concentration Units (all data):	mg/L

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	3/2/2005	0.005	0.005	0.005	0.005	0.005	
2	11/1/2005	0.005	0.005	0.005	0.005	0.005	
3	2/28/2006	0.005	0.005	0.005	0.005	0.005	
4	4/27/2006	0.005	0.005	0.005	0.005	0.005	
5	7/3/2006	0.005	0.005	0.005	0.005	0.05	
6	10/13/2006	0.005	0.005	0.005	0.005	0.005	
7	2/9/2007	0.005	0.005	0.005	0.005	0.005	
8	5/2/2007	0.005	0.005	0.005	0.005	0.07	
9	7/26/2007	0.005	0.005	0.005	0.005	0.005	
10	10/15/2007	0.005	0.005	0.005	0.005	0.005	
11	1/28/2008	0.005	0.005	0.005	0.005	0.005	
12	4/25/2008	0.005	0.005	0.005	0.005	0.008	
13	8/11/2008	0.005	0.005	0.005	0.005	0.37	
14	1/15/2009	0.005	0.005	0.005	0.005	0.005	
15	4/9/2009	0.019	0.008	0.007	0.005	0.005	
16	9/2/2009	0.01	0.043	0.007	0.011	0.005	
17	10/16/2009	0.005	0.005	0.005	0.005	0.005	
18	1/14/2010	0.005	0.005	0.005	0.005	0.005	
19	7/14/2010	0.006	0.009	0.005	0.01	0.005	
20	8/16/2010	0.005		0.005	0.005	0.005	
21	10/28/2010	0.01		0.01	0.01	0.01	
22	3/15/2011	0.01		0.01	0.01	0.01	
23	6/21/2011	0.005		0.025	0.005	0.005	
24	9/19/2011	0.005		0.005	0.005	0.005	
25	12/13/2011	0.005		0.005	0.005	0.005	
26	2/22/2012	0.05		0.05	0.05		
27	9/12/2012	0.05		0.05	0.05		
28	12/6/2012	0.05		0.05	0.05		
29	2/19/2013	0.05		0.05	0.05		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Not Significant	Not Significant	Not Significant
MW3	Compliance Well #2	Not normal	Not normal	Not Significant	Not Significant	Not Significant
MW4	Compliance Well #3	Not normal	Not normal	Not Significant	Not Significant	Not Significant
CB	Compliance Well #4	Not normal	Not normal	Not Significant	Not Significant	Not Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	1.145E-05	0.627337558	Slight Increase	Moderately Strong
MW2	Compliance Well #1	5.16967E-06	0.337917565	Slight Increase	Moderately Weak
MW3	Compliance Well #2	1.21878E-05	0.661632255	Slight Increase	Moderately Strong
MW4	Compliance Well #3	1.15453E-05	0.6341101	Slight Increase	Moderately Strong
CB	Compliance Well #4	-5.64644E-06	-0.056590479	Slight Decrease	Very Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well	4	13.8%			29
MW2	Compliance Well #1	1	5.3%			19
MW3	Compliance Well #2	5	17.2%			29
MW4	Compliance Well #3	4	13.8%			29
CB	Compliance Well #4	3	12%			25
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	0.050	0.005	0.012		
MW2	Compliance Well #1	0.043	0.005	0.007		
MW3	Compliance Well #2	0.050	0.005	0.012		
MW4	Compliance Well #3	0.050	0.005	0.012		
CB	Compliance Well #4	0.370	0.005	0.025		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	Total Kjeldahl Nitrogen
Applicable GW Standard (if none leave	
Applicable GW Criteria (if none leave blank):	
Concentration Units (all data):	mg/L

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	3/2/2005	0.5	1.7	126	8.5	35.5	
2	11/1/2005	0.5	1.85	97.2	4.98	5.07	
3	2/28/2006	0.5	1.51	77.3	3.75	0.5	
4	4/27/2006	0.5	1.4	83.2	3.75	0.5	
5	7/3/2006	0.5	1.55	114	3.19	0.55	
6	10/13/2006	0.5	1.54	82.7	3.04	3.98	
7	2/9/2007	0.5	1.21	62.9	2.84	10.8	
8	5/2/2007	0.5	1.34	2.48	81.6	8.55	
9	7/26/2007	0.5	1.56	82	2.51	17.8	
10	10/15/2007	0.5	1.69	90.1	2.6	22.7	
11	1/28/2008	0.5	2.6	86.1	3.7	4	
12	4/25/2008	15	5.2	78.4	25.3	3.1	
13	8/11/2008	2.6	2.3	0.5	4.4	6.2	
14	1/15/2009	2.24	6.72	121.8	6.72	4.76	
15	4/9/2009	5.38	9.68	81.1	6.18	0.5	
16	9/2/2009	0.12	2.1	71.5	1.63	0.5	
17	10/16/2009	0.5	1.9	102.7	1.76	0.5	
18	1/14/2010	0.5	1.6	70.6	1.2	3.9	
19	7/14/2010	0.5	0.9	71.8	1	3.1	
20	8/16/2010	0.5		1.36	26	0.4	
21	10/28/2010	0.42		114.1	1.88	0.74	
22	3/15/2011	0.2		71.6	1.6	3.7	
23	6/21/2011	0.2		58.6	1.62	3.76	
24	9/19/2011	2.06		92.44	2.84	1.24	
25	12/13/2011	0.2		81.2	0.3	3.3	
26	2/22/2012	0.2		83.5	1.18		
27	9/12/2012	0.2		85.5	1.33		
28	12/6/2012	0.2		84.3	85.6		
29	2/19/2013	0.2		80	1.13		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Significant	Significant	Significant
MW3	Compliance Well #2	Not normal	Not normal	Not Significant	Significant	Significant
MW4	Compliance Well #3	Not normal	Not normal	Not Significant	Significant	Significant
CB	Compliance Well #4	Not normal	Not normal	Not Significant	Significant	Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	-0.000321322	-0.096571571	Slight Decrease	Very Weak
MW2	Compliance Well #1	0.001202176	0.305435377	Slight Increase	Moderately Weak
MW3	Compliance Well #2	-0.003409417	-0.094450221	Slight Decrease	Very Weak
MW4	Compliance Well #3	0.001560642	0.06287564	Slight Increase	Very Weak
CB	Compliance Well #4	-0.00492511	-0.440949808	Slight Decrease	Moderately Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well					29
MW2	Compliance Well #1					19
MW3	Compliance Well #2					29
MW4	Compliance Well #3					29
CB	Compliance Well #4					25
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	15.000	0.120	1.266		
MW2	Compliance Well #1	9.680	0.900	2.545		
MW3	Compliance Well #2	126.000	0.500	77.758		
MW4	Compliance Well #3	85.600	0.300	10.073		
CB	Compliance Well #4	35.500	0.400	5.826		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	Ammonia
Applicable GW Standard (if none leave	0.025
Applicable GW Criteria (if none leave blank):	
Concentration Units (all data):	mg/L

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	3/2/2005	0.08	0.07	1.64	74.4	5.86	
2	11/1/2005	0.05	1.46	91.2	4.87	4.42	
3	2/28/2006	0.005	1.18	80.2	3.28	0.005	
4	4/27/2006	0.005	1.15	85.8	2.86	0.06	
5	7/3/2006	0.005	1.34	82.6	2.8	0.09	
6	10/13/2006	0.005	1.43	80.4	2.27	0.005	
7	2/9/2007	0.005	1.27	78.7	1.52	9.99	
8	5/2/2007	0.005	1.25	1.74	85	6.94	
9	7/26/2007	0.005	1.2	92.2	1.88	15.9	
10	10/15/2007	0.005	1.46	98.1	1.74	17.8	
11	1/28/2008	0.01	1.54	74.64	2.04	2.53	
12	4/25/2008	0.02	1.09	68.69	1.93	1.82	
13	8/11/2008	0.02	1.43	0.01	1.71	2.82	
14	1/15/2009	0.02	1.45	78.75	1.73	0.01	
15	4/9/2009	0.01	1.17	65.8	1.22	0.27	
16	9/2/2009	0.01	1.6	63	1.5	0.05	
17	10/16/2009	0.005	0.74	81.2	1.42	0.03	
18	1/14/2010	0.01	1.1	64.8	1.08	3.69	
19	7/14/2010	0.005	0.77	60.3	0.92	2.74	
20	8/16/2010	0.02		1.09	19.7	0.06	
21	10/28/2010	0.01		66.3	0.82	0.02	
22	3/15/2011	0.005		67.2	1.29	3.2	
23	6/21/2011	0.005		54.7	1.1	3.37	
24	9/19/2011	0.01		51.3	0.75	0.17	
25	12/13/2011	0.005		66.49	0.1	2.47	
26	2/22/2012	0.005		82.1	0.78		
27	9/12/2012	0.005		93.6	1.15		
28	12/6/2012	0.005		85.6	0.92		
29	2/19/2013	0.005		89.3	0.75		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Significant	Significant	Significant
MW3	Compliance Well #2	Not normal	Not normal	Not Significant	Significant	Significant
MW4	Compliance Well #3	Not normal	Not normal	Not Significant	Significant	Significant
CB	Compliance Well #4	Not normal	Normal	Not Significant	Significant	Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	-7.95786E-06	-0.425929335	Slight Decrease	Moderately Weak
MW2	Compliance Well #1	6.35036E-05	0.100920265	Slight Increase	Very Weak
MW3	Compliance Well #2	0.003238474	0.096339831	Slight Increase	Very Weak
MW4	Compliance Well #3	-0.00854358	-0.360525665	Slight Decrease	Moderately Weak
CB	Compliance Well #4	-0.001688063	-0.259241405	Slight Decrease	Moderately Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well	2	6.9%			29
MW2	Compliance Well #1	19	100%			19
MW3	Compliance Well #2	28	96.6%			29
MW4	Compliance Well #3	29	100%			29
CB	Compliance Well #4	21	84%			25
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	0.080	0.005	0.012		
MW2	Compliance Well #1	1.600	0.070	1.195		
MW3	Compliance Well #2	98.100	0.010	65.774		
MW4	Compliance Well #3	85.000	0.100	7.639		
CB	Compliance Well #4	17.800	0.005	3.373		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	Zinc
Applicable GW Standard (if none leave	0.05
Applicable GW Criteria (if none leave blank):	
Concentration Units (all data):	mg/L

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	3/2/2005	0.01	0.28	0.23	0.14	0.08	
2	11/1/2005	0.01	0.01	0.01	0.01	0.21	
3	2/28/2006	0.01	0.04	0.01	0.02	0.02	
4	4/27/2006	0.01	0.01	0.01	0.02	0.02	
5	7/3/2006	0.01	0.01	0.02	0.04	0.02	
6	10/13/2006	0.01	0.03	0.01	0.01	0.02	
7	2/9/2007	0.01	0.01	0.01	0.01	0.039	
8	5/2/2007	0.01	0.01	0.01	0.01	0.019	
9	7/26/2007	0.02	0.02	0.02	0.022	0.033	
10	10/15/2007	0.01	0.01	0.02	0.01	0.01	
11	1/28/2008	0.01	0.01	0.012	0.015	0.034	
12	4/25/2008	0.01	0.02	0.024	0.03	0.03	
13	8/11/2008	0.01	0.017	0.01	0.026	0.056	
14	1/15/2009	0.01	0.015	0.01	0.01	0.01	
15	4/9/2009	0.01	0.01	0.019	0.024	0.029	
16	9/2/2009	0.01	0.012	0.02	0.025	0.05	
17	10/16/2009	0.01	0.01	0.01	0.01	0.037	
18	1/14/2010	0.01	0.01	0.01	0.011	0.014	
19	7/14/2010	0.01	0.01	0.01	0.01	0.01	
20	8/16/2010	0.01		0.01	0.01	0.01	
21	10/28/2010	0.01		0.05	0.05	0.05	
22	3/15/2011	0.01		0.01	0.01	0.01	
23	6/21/2011	0.01		0.01	0.01	0.01	
24	9/19/2011	0.01		0.01	0.01	0.01	
25	12/13/2011	0.01		0.01	0.01	0.01	
26	2/22/2012	0.01		0.01	0.0128		
27	9/12/2012	0.01		0.01	0.0167		
28	12/6/2012	0.01		0.05	0.015		
29	2/19/2013	0.01		0.01	0.0172		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Significant	Not Significant	Significant
MW3	Compliance Well #2	Not normal	Not normal	Not Significant	Not Significant	Significant
MW4	Compliance Well #3	Not normal	Not normal	Not Significant	Significant	Significant
CB	Compliance Well #4	Not normal	Not normal	Not Significant	Significant	Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	-3.01324E-07	-0.139070817	Slight Decrease	Very Weak
MW2	Compliance Well #1	-4.98084E-05	-0.461240933	Slight Decrease	Moderately Weak
MW3	Compliance Well #2	-1.35405E-05	-0.281201858	Slight Decrease	Moderately Weak
MW4	Compliance Well #3	-1.03782E-05	-0.35741157	Slight Decrease	Moderately Weak
CB	Compliance Well #4	-2.39711E-05	-0.432164207	Slight Decrease	Moderately Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well	0	0%			29
MW2	Compliance Well #1	1	5.3%			19
MW3	Compliance Well #2	3	10.3%			29
MW4	Compliance Well #3	2	6.9%			29
CB	Compliance Well #4	5	20%			25
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	0.020	0.010	0.010		
MW2	Compliance Well #1	0.280	0.010	0.029		
MW3	Compliance Well #2	0.230	0.010	0.023		
MW4	Compliance Well #3	0.140	0.010	0.021		
CB	Compliance Well #4	0.210	0.010	0.034		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	Copper
Applicable GW Standard (if none leave	1.0
Applicable GW Criteria (if none leave blank):	
Concentration Units (all data):	mg/L

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	3/2/2005	0.01	0.01	0.01	0.01	0.01	
2	11/1/2005	0.01	0.01	0.01	0.01	0.01	
3	2/28/2006	0.01	0.01	0.01	0.01	0.01	
4	4/27/2006	0.01	0.01	0.01	0.01	0.01	
5	7/3/2006	0.01	0.01	0.01	0.01	0.01	
6	10/13/2006	0.01	0.01	0.01	0.01	0.01	
7	2/9/2007	0.001	0.0024	0.002	0.002	0.0024	
8	5/2/2007	0.01	0.01	0.01	0.01	0.01	
9	7/26/2007	0.01	0.01	0.01	0.01	0.01	
10	10/15/2007	0.01	0.01	0.01	0.01	0.01	
11	1/28/2008	0.01	0.01	0.01	0.01	0.01	
12	4/25/2008	0.01	0.01	0.039	0.01	0.01	
13	8/11/2008	0.01	0.01	0.02	0.01	0.01	
14	1/15/2009	0.01	0.01	0.01	0.01	0.01	
15	4/9/2009	0.01	0.01	0.01	0.01	0.01	
16	9/2/2009	0.01	0.01	0.064	0.01	0.01	
17	10/16/2009	0.01	0.01	0.052	0.01	0.01	
18	1/14/2010	0.01	0.01	0.01	0.01	0.01	
19	7/14/2010	0.01	0.01	0.01	0.01	0.01	
20	8/16/2010	0.01		0.01	0.01	0.01	
21	10/28/2010	0.02		0.02	0.02	0.02	
22	3/15/2011	0.02		0.02	0.02	0.02	
23	6/21/2011	0.02		0.02	0.02	0.02	
24	9/19/2011	0.02		0.02	0.02	0.02	
25	12/13/2011	0.02		0.02	0.02	0.02	
26	2/22/2012	0.01		0.01	0.01		
27	9/12/2012	0.01		0.01	0.01		
28	12/6/2012	0.01		0.01	0.01		
29	2/19/2013	0.01		0.01	0.01		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Not Significant	Not Significant	Not Significant
MW3	Compliance Well #2	Not normal	Not normal	Not Significant	Significant	Not Significant
MW4	Compliance Well #3	Not normal	Not normal	Not Significant	Not Significant	Not Significant
CB	Compliance Well #4	Not normal	Not normal	Not Significant	Not Significant	Not Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	2.27087E-06	0.450307742	Slight Increase	Moderately Weak
MW2	Compliance Well #1	3.7278E-07	0.121585865	Slight Increase	Very Weak
MW3	Compliance Well #2	2.41618E-06	0.153365138	Slight Increase	Very Weak
MW4	Compliance Well #3	2.23262E-06	0.451375778	Slight Increase	Moderately Weak
CB	Compliance Well #4	4.14964E-06	0.68032008	Slight Increase	Moderately Strong
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well	0	0%			29
MW2	Compliance Well #1	0	0%			19
MW3	Compliance Well #2	0	0%			29
MW4	Compliance Well #3	0	0%			29
CB	Compliance Well #4	0	0%			25
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	0.020	0.001	0.011		
MW2	Compliance Well #1	0.010	0.002	0.010		
MW3	Compliance Well #2	0.064	0.002	0.016		
MW4	Compliance Well #3	0.020	0.002	0.011		
CB	Compliance Well #4	0.020	0.002	0.012		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	BOD5
Applicable GW Standard (if none leave	
Applicable GW Criteria (if none leave blank):	
Concentration Units (all data):	mg/L

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	3/2/2005	2	4	8	11	1	
2	11/1/2005	1	3	5	8	20	
3	2/28/2006	3	5	6	12	5	
4	4/27/2006	1	5	6	9	1	
5	7/3/2006	1	8	6	14	1	
6	10/13/2006	1	8	11	15	5	
7	2/9/2007	1	1	9	6	1	
8	5/2/2007	1	1	10	11	1	
9	7/26/2007	1	5	6	14	1	
10	10/15/2007	1	5	15	9	1	
11	1/28/2008	1	3.2	10.2	5.9	4	
12	4/25/2008	1	1	9.7	8.3	1	
13	8/11/2008	1	4.1	3	10.8	12.3	
14	1/15/2009	3.9	9.5	11	14.3	1	
15	4/9/2009	1	1	8.7	4.8	1	
16	9/2/2009	5.3	14.7	11	12.8	1	
17	10/16/2009	1	5.5	11.1	12.7	1	
18	1/14/2010	1	5.6	10.2	7.3	1	
19	7/14/2010	1	11.6	1	6.5	1	
20	8/16/2010	1		7	4.4	1	
21	10/28/2010	1		9.6	7.5	5	
22	3/15/2011	1		5.2	1	1	
23	6/21/2011	1		8.2	11.9	1	
24	9/19/2011	1		6.4	7	1	
25	12/13/2011	1		11	1	1	
26	2/22/2012	1		4.4	2.8		
27	9/12/2012	1		1	2.2		
28	12/6/2012	1		1	1		
29	2/19/2013	1		5.3	2.2		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Significant	Significant	Significant
MW3	Compliance Well #2	Not normal	Not normal	Not Significant	Significant	Significant
MW4	Compliance Well #3	Not normal	Not normal	Not Significant	Significant	Significant
CB	Compliance Well #4	Not normal	Not normal	Not Significant	Not Significant	Not Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	-0.000163049	-0.138967337	Slight Decrease	Very Weak
MW2	Compliance Well #1	0.002424278	0.371763011	Slight Increase	Moderately Weak
MW3	Compliance Well #2	-0.00122079	-0.3019601	Slight Decrease	Moderately Weak
MW4	Compliance Well #3	-0.003351111	-0.652900022	Slight Decrease	Moderately Strong
CB	Compliance Well #4	-0.001873699	-0.314470133	Slight Decrease	Moderately Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well					29
MW2	Compliance Well #1					19
MW3	Compliance Well #2					29
MW4	Compliance Well #3					29
CB	Compliance Well #4					25
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	5.300	1.000	1.352		
MW2	Compliance Well #1	14.700	1.000	5.326		
MW3	Compliance Well #2	15.000	1.000	7.483		
MW4	Compliance Well #3	15.000	1.000	8.048		
CB	Compliance Well #4	20.000	1.000	2.812		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	COD
Applicable GW Standard (if none leave	
Applicable GW Criteria (if none leave blank):	
Concentration Units (all data):	mg/L

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	3/2/2005	35	67	74	104	41	
2	11/1/2005	2	2	52	52	24	
3	2/28/2006	28	56	69	84	23	
4	4/27/2006	2	2	62	37	2	
5	7/3/2006	37	16	142	65	23	
6	10/13/2006	2	15	71	45	26	
7	2/9/2007	2	2	59	35	17	
8	5/2/2007	2	21	51	72	21	
9	7/26/2007	2	2	37	27	2	
10	10/15/2007	2	31	75	43	33	
11	1/28/2008	15.7	43.1	82.3	66.6	23.5	
12	4/25/2008	51	62	92	76	28	
13	8/11/2008	20.2	44.4	2	56.7	30.3	
14	1/15/2009	30	50	92	50	24	
15	4/9/2009	9.3	18.5	74.1	38.9	9.3	
16	9/2/2009	33.3	62.7	101.9	70.6	13.7	
17	10/16/2009	28.3	22.7	94.4	37.8	7.6	
18	1/14/2010	7.6	51.4	87.6	57.2	22.9	
19	7/14/2010	12.5	50	64.3	85.7	21.4	
20	8/16/2010	14.8		48.1	66.7	22.2	
21	10/28/2010	9.5		89.7	43.1	25.9	
22	3/15/2011	11.8		92.1	64.7	17.6	
23	6/21/2011	7.3		94.6	40	25.5	
24	9/19/2011	11.1		100	48.2	25.9	
25	12/13/2011	<4.0		84.9	24.5	18.9	
26	2/22/2012	<10		44.3	35		
27	9/12/2012	<10		50.7	23		
28	12/6/2012	<10		50.9	20.4		
29	2/19/2013	<10		50.4	25.5		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Significant	Significant	Significant
MW3	Compliance Well #2	Not normal	Not normal	Not Significant	Significant	Significant
MW4	Compliance Well #3	Not normal	Not normal	Not Significant	Significant	Significant
CB	Compliance Well #4	Not normal	Not normal	Not Significant	Significant	Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	-0.003992219	-0.255337308	Slight Decrease	Moderately Weak
MW2	Compliance Well #1	0.012829542	0.318008271	Slight Increase	Moderately Weak
MW3	Compliance Well #2	-0.001039127	-0.033618387	Slight Decrease	Very Weak
MW4	Compliance Well #3	-0.011985686	-0.48696993	Slight Decrease	Moderately Weak
CB	Compliance Well #4	-0.001138088	-0.093534342	Slight Decrease	Very Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well					29
MW2	Compliance Well #1					19
MW3	Compliance Well #2					29
MW4	Compliance Well #3					29
CB	Compliance Well #4					25
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	51.000	2.000	15.683		
MW2	Compliance Well #1	67.000	2.000	32.568		
MW3	Compliance Well #2	142.000	2.000	72.010		
MW4	Compliance Well #3	104.000	20.400	51.538		
CB	Compliance Well #4	41.000	2.000	21.148		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	Sulfate
Applicable GW Standard (if none leave	
Applicable GW Criteria (if none leave blank):	25
Concentration Units (all data):	mg/L

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	3/2/2005	1	29.8	9.9	1	12.4	
2	11/1/2005	1	27.1	17	1	15.9	
3	2/28/2006	5.5	23.6	17.8	4.64	15.8	
4	4/27/2006	3.21	24	21.1	5.3	20	
5	7/3/2006	11.4	30.2	23.9	6.59	29.9	
6	10/13/2006	6.36	27.1	19.3	1	14.2	
7	2/9/2007	4.9	29.7	24.2	3.29	14.9	
8	5/2/2007	4.15	32.8	3.55	21.1	15	
9	7/26/2007	4.54	29.5	17.9	4.43	6.05	
10	10/15/2007	1	31	12	2.6	3.3	
11	1/28/2008	3.6	36.1	1	1	9.6	
12	4/25/2008	5.4	32.8	5.8	4.6	23.8	
13	8/11/2008	4.4	34.9	2	1	25	
14	1/15/2009	3.5	40.1	7.1	10.4	14.1	
15	4/9/2009	1	41.3	1	1	11.8	
16	9/2/2009	1	42.6	2.4	3.6	1	
17	10/16/2009	3.8	39	4.2	13.4	2.9	
18	1/14/2010	3.1	50	2.9	6.5	18.9	
19	7/14/2010	4.7	49.7	1	7	17.6	
20	8/16/2010	1		4.6	2.5	13.6	
21	10/28/2010	18.2		2.9	3.5	16.6	
22	3/15/2011	6.2		2.9	2.2	18.1	
23	6/21/2011	7		8.5	4.5	20.4	
24	9/19/2011	2.5		6.4	2.4	14	
25	12/13/2011	3.3		13.9	3.7	18.4	
26	2/22/2012	1		28.3	2.9		
27	9/12/2012	1.4		12.7	2.6		
28	12/6/2012	1		11.3	2.5		
29	2/19/2013	1		66.8	61.5		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Significant	Significant	Significant
MW3	Compliance Well #2	Not normal	Not normal	Not Significant	Significant	Significant
MW4	Compliance Well #3	Not normal	Not normal	Not Significant	Not Significant	Not Significant
CB	Compliance Well #4	Normal	Not normal	Not Significant	Significant	Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	-0.000421143	-0.09873543	Slight Decrease	Very Weak
MW2	Compliance Well #1	0.012318661	0.903648051	Slight Increase	Very Strong
MW3	Compliance Well #2	0.00131346	0.085148945	Slight Increase	Very Weak
MW4	Compliance Well #3	0.003558339	0.267261533	Slight Increase	Moderately Weak
CB	Compliance Well #4	-0.000165419	-0.017937294	Slight Decrease	Very Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well			0	0%	29
MW2	Compliance Well #1			17	89.5%	19
MW3	Compliance Well #2			2	6.9%	29
MW4	Compliance Well #3			1	3.4%	29
CB	Compliance Well #4			2	8%	25
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	18.200	1.000	4.006		
MW2	Compliance Well #1	50.000	23.600	34.279		
MW3	Compliance Well #2	66.800	1.000	12.150		
MW4	Compliance Well #3	61.500	1.000	6.474		
CB	Compliance Well #4	29.900	1.000	14.930		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	Total Dissoved Solids
Applicable GW Standard (if none leave	
Applicable GW Criteria (if none leave blank):	250
Concentration Units (all data):	mg/L

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	3/2/2005	10	260	410	104	326	
2	11/1/2005	60	268	478	278	304	
3	2/28/2006	20	244	496	312	112	
4	4/27/2006	42	246	520	350	124	
5	7/3/2006	10	228	504	324	90	
6	10/13/2006	58	292	592	454	118	
7	2/9/2007	36	268	478	318	252	
8	5/2/2007	36	254	274	530	230	
9	7/26/2007	64	312	552	326	466	
10	10/15/2007	10	202	460	348	472	
11	1/28/2008	34	284	552	378	360	
12	4/25/2008	18	296	536	398	206	
13	8/11/2008	26	318	10	424	268	
14	1/15/2009	40	314	520	372	214	
15	4/9/2009	44	304	504	340	152	
16	9/2/2009	56	308	504	378	232	
17	10/16/2009	74	382	546	442	258	
18	1/14/2010	10	190	370	255	132	
19	7/14/2010	52	310	635	460	260	
20	8/16/2010	35		488	586	212	
21	10/28/2010	32		454	336	256	
22	3/15/2011	66		534	362	214	
23	6/21/2011	70		502	406	272	
24	9/19/2011	54		564	464	206	
25	12/13/2011	66		466	366	282	
26	2/22/2012	38		521	396		
27	9/12/2012	32		453	456		
28	12/6/2012	47		485	404		
29	2/19/2013	61		513	413		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Significant	Significant	Significant
MW3	Compliance Well #2	Not normal	Not normal	Not Significant	Significant	Significant
MW4	Compliance Well #3	Not normal	Not normal	Not Significant	Significant	Significant
CB	Compliance Well #4	Not normal	Not normal	Significant	Significant	Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	0.00883366	0.387992571	Slight Increase	Moderately Weak
MW2	Compliance Well #1	0.032133468	0.401299236	Slight Increase	Moderately Weak
MW3	Compliance Well #2	0.015454115	0.11758325	Slight Increase	Very Weak
MW4	Compliance Well #3	0.047128543	0.454574019	Slight Increase	Moderately Weak
CB	Compliance Well #4	0.000608502	0.004618194	Slight Increase	Very Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well			0	0%	29
MW2	Compliance Well #1			14	73.7%	19
MW3	Compliance Well #2			28	96.6%	29
MW4	Compliance Well #3			28	96.6%	29
CB	Compliance Well #4			12	48%	25
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	74.000	10.000	41.414		
MW2	Compliance Well #1	382.000	190.000	277.895		
MW3	Compliance Well #2	635.000	10.000	480.034		
MW4	Compliance Well #3	586.000	104.000	378.621		
CB	Compliance Well #4	472.000	90.000	240.720		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	Sodium
Applicable GW Standard (if none leave	270
Applicable GW Criteria (if none leave blank):	25
Concentration Units (all data):	mg/L

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	3/2/2005	6.8	43.3	74.9	35.8	32.5	
2	11/1/2005	3.3	40	103	41.3	28.8	
3	2/28/2006	4.2	41.1	67.4	45.3	15	
4	4/27/2006	4.4	40.2	72.6	46.7	15.4	
5	7/3/2006	4.1	41.2	72	48.9	13.9	
6	10/13/2006	3.7	42	71.5	52.8	9.9	
7	2/9/2007	4.1	43	70	53	34	
8	5/2/2007	5.1	44	55	71	1	
9	7/26/2007	4	45	77	55	49	
10	10/15/2007	3.4	44	67	57	60	
11	1/28/2008	3.26	67.5	117	64.2	49.1	
12	4/25/2008	7.06	52	329	70	41	
13	8/11/2008	3.21	48	1	62	52	
14	1/15/2009	3.49	53	77.1	69.6	37.1	
15	4/9/2009	3.64	63.3	70.9	66.1	28.1	
16	9/2/2009	2.96	46	63.5	65.5	9.04	
17	10/16/2009	2.63	50.9	69.3	71.6	10.1	
18	1/14/2010	3.52	51.7	75.7	74.6	46.8	
19	7/14/2010	3.51	51.2	67.9	65.9	44.8	
20	8/16/2010	2.64		77	77.1	36.6	
21	10/28/2010	2.73		64.9	71.8	35.7	
22	3/15/2011	3.18		80.7	79.7	52.7	
23	6/21/2011	3.13		63.4	67.1	78.7	
24	9/19/2011	2.26		51.1	57.7	30.5	
25	12/13/2011	5.17		85.5	89.4	66.4	
26	2/22/2012	4.8		72	79.1		
27	9/12/2012	3.35		68	78.5		
28	12/6/2012	3.24		64.2	80.7		
29	2/19/2013	3.85		64.5	80		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Significant	Significant	Significant
MW3	Compliance Well #2	Not normal	Not normal	Not Significant	Significant	Significant
MW4	Compliance Well #3	Normal	Normal	Not Significant	Significant	Significant
CB	Compliance Well #4	Normal	Not normal	Not Significant	Significant	Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	-0.000482325	-0.372094358	Slight Decrease	Moderately Weak
MW2	Compliance Well #1	0.00800395	0.600737855	Slight Increase	Moderately Strong
MW3	Compliance Well #2	-0.007460344	-0.124277862	Slight Decrease	Very Weak
MW4	Compliance Well #3	0.013381962	0.858642423	Slight Increase	Very Strong
CB	Compliance Well #4	0.012633522	0.475486094	Slight Increase	Moderately Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well	0	0%	0	0%	29
MW2	Compliance Well #1	0	0%	19	100%	19
MW3	Compliance Well #2	1	3.4%	28	96.6%	29
MW4	Compliance Well #3	0	0%	29	100%	29
CB	Compliance Well #4	0	0%	18	72%	25
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	7.060	2.260	3.818		
MW2	Compliance Well #1	67.500	40.000	47.758		
MW3	Compliance Well #2	329.000	1.000	79.072		
MW4	Compliance Well #3	89.400	35.800	64.738		
CB	Compliance Well #4	78.700	1.000	35.126		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	Specific Conductance
Applicable GW Standard (if none leave	
Applicable GW Criteria (if none leave blank):	
Concentration Units (all data):	umhos/cm

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	1/28/2008	74	464	1412	598	5960	
2	4/25/2008	43	458	1294	614	400	
3	8/11/2008	40	448	0.2	604	384	
4	1/15/2009	351	490	1322	578	479	
5	4/9/2009	184	440	1173	575	291	
6	9/2/2009	175	440	1181	611	216	
7	10/16/2009	335	442	1198	601	210	
8	1/14/2010	39	429	1036	545	329	
9	7/14/2010	46	416	1118	502	382	
10	8/16/2010	25		726	450	280	
11	10/28/2010	14		756	361	238	
12	3/15/2011	30		703	340	242	
13	6/21/2011	16		692	324	259	
14	9/19/2011	25		674	350	212	
15	12/13/2011	42		705	322	316	
16	2/22/2012	35		1583	8		
17	9/12/2012	39		1443	643		
18	12/6/2012	32		1450	723		
19	2/19/2013	40		1340	622		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Not normal	Not normal	Significant	Significant	Significant
MW3	Compliance Well #2	Normal	Not normal	Significant	Significant	Significant
MW4	Compliance Well #3	Not normal	Not normal	Significant	Significant	Significant
CB	Compliance Well #4	Not normal	Not normal	Significant	Not Significant	Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	-0.076126278	-0.425332799	Slight Decrease	Moderately Weak
MW2	Compliance Well #1	-0.050142004	-0.705659451	Slight Decrease	Moderately Strong
MW3	Compliance Well #2	0.100568501	0.146165902	Slight Increase	Very Weak
MW4	Compliance Well #3	-0.089946388	-0.301307205	Slight Decrease	Moderately Weak
CB	Compliance Well #4	-1.51468788	-0.470706582	Strong Decrease	Moderately Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well					19
MW2	Compliance Well #1					9
MW3	Compliance Well #2					19
MW4	Compliance Well #3					19
CB	Compliance Well #4					15
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	351.000	14.000	83.421		
MW2	Compliance Well #1	490.000	416.000	447.444		
MW3	Compliance Well #2	1583.000	0.200	1042.432		
MW4	Compliance Well #3	723.000	8.000	493.211		
CB	Compliance Well #4	5960.000	210.000	679.867		
	Compliance Well #5					

Groundwater Monitoring Data Analysis (v.3)

Facility Name:	Tyson Foods - Glen Allen
Permit No.:	VA0004031
Monitoring Parameter:	pH
Applicable GW Criteria (Lower):	5.5
Applicable GW Criteria (Higher):	8.5
Concentration Units (all data):	S.U.

		Data Entry					
	Well Designation ►	MW1	MW2	MW3	MW4	CB	
	Sample or Report Date (ascending)	Background Well Data	Compliance Well #1	Compliance Well #2	Compliance Well #3	Compliance Well #4	Compliance Well #5
1	1/28/2008	4.96	5.77	6.24	5.67	5.77	
2	4/25/2008	5.01	5.66	6.36	5.61	5.46	
3	8/11/2008	6.64	6.9		6.78	6.72	
4	1/15/2009	6.08	5.92	6.19	5.96	7.05	
5	4/9/2009	6.34	6.49	6.68	6.8	6.96	
6	9/2/2009	7.14	7.32	7.12	6.8	7.21	
7	10/16/2009	5.6	6.33	5.81	6.03	6.78	
8	1/14/2010	9.21	6.26	8.37	7.3	7.82	
9	7/14/2010	6.23	6.34	6.93	6.26	6.72	
10	8/16/2010	5.6		6.58	5.95	7.24	
11	10/28/2010	5.38		6.56	6.17	7.32	
12	3/15/2011	5.78		6.59	6.21	5.88	
13	6/21/2011	5.74		6.65	6.01	6.22	
14	9/19/2011	5.63		6.41	5.91	6.35	
15	12/13/2011	5.75		6.58	6.01	6.39	
16	2/22/2012	6.02		6.43	6.6		
17	9/12/2012	4.93		6.61	5.98		
18	12/6/2012	5.06		6.02	7.76		
19	2/19/2013	5.58		5.95	6.69		
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Results: Significance to Background **

		Distribution Tests		Non-normal Test	Normal Tests	
		Shapiro-Wilk Normality Test	Shapiro-Wilk Log-Normality Test	Wilcoxon Rank Sum Test	T-test	T-test (lognormal)
MW1	Background Well	Not normal	Not normal	N/A		
MW2	Compliance Well #1	Normal	Normal	Not Significant	Not Significant	Not Significant
MW3	Compliance Well #2	Not normal	Not normal	Significant	Significant	Significant
MW4	Compliance Well #3	Not normal	Not normal	Significant	Not Significant	Significant
CB	Compliance Well #4	Not normal	Not normal	Significant	Significant	Significant
	Compliance Well #5					

** Please note that the above cells will appear blank in cases where a test cannot be conducted due to lack of data, or if the test assumptions are invalid due to lack of data variation.

Results: Linear Regression Trend Analysis and

		Regression Line Slope	Pearson Correlation (R)	Interpretation	
				Linear Trend	Degree of Data Linearity
MW1	Background Well	-0.000381942	-0.223091449	Slight Decrease	Very Weak
MW2	Compliance Well #1	0.00069582	0.393871696	Slight Increase	Moderately Weak
MW3	Compliance Well #2	-0.000151421	-0.152225712	Slight Decrease	Very Weak
MW4	Compliance Well #3	0.000262375	0.267543325	Slight Increase	Moderately Weak
CB	Compliance Well #4	0.000150565	0.105555715	Slight Increase	Very Weak
	Compliance Well #5				

Results: Groundwater Standards/Criteria Comparison

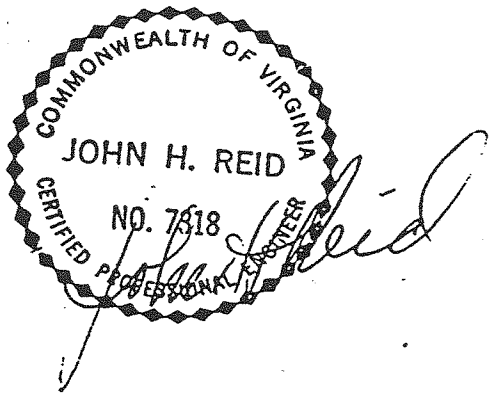
		Groundwater Standard		Groundwater Criteria		Total No. of Data Points
		No. Violations of GW Standard	% Violations of GW Standard	No. Violations of GW Criteria	% Violations of GW Criteria	
MW1	Background Well	14	73.7%	1	5.3%	19
MW2	Compliance Well #1	9	100%	0	0%	9
MW3	Compliance Well #2	18	100%	0	0%	18
MW4	Compliance Well #3	19	100%	0	0%	19
CB	Compliance Well #4	14	93.3%	0	0%	15
	Compliance Well #5					

Results: Basic Statistics (less-than values ignored)

		Maximum Value	Minimum Value	Average		
MW1	Background Well	9.210	4.930	5.931		
MW2	Compliance Well #1	7.320	5.660	6.332		
MW3	Compliance Well #2	8.370	5.810	6.560		
MW4	Compliance Well #3	7.760	5.610	6.342		
CB	Compliance Well #4	7.820	5.460	6.659		
	Compliance Well #5					

LAGOON CLOSURE PLAN

FOR THE
TYSON FOODS, INC.
POULTRY PROCESSING PLANT
AT
GLEN ALLEN, VIRGINIA



APRIL 9, 1992

SUBMITTED BY
REID ENGINEERING COMPANY, INC.
1211 CAROLINE STREET
FREDERICKSBURG, VIRGINIA 22401
(703) 371-8500, FAX. (703) 371-8576

LAGOON CLOSURE PLAN

FOR

TYSON FOODS, INC.
POULTRY PROCESSING PLANT

Glen Allen, VA

I. INTRODUCTION

This report presents a proposed closure plan for three (3) wastewater treatment lagoons at the Tyson Foods, Inc. Poultry Processing Plant in Glen Allen, VA. The closure plan and subsequent closure of the lagoons have been mandated by the Virginia Water Control Board. This report includes:

* site description,
* description of the proposed lagoon closure procedure,
* post-closure maintenance plan,
* proposed lagoon closure schedule.

II. DESCRIPTION OF SITE & EXISTING LAGOONS

The Tyson Foods, Inc. Poultry Processing Plant is located approximately 18 miles north west of Richmond, VA on Highway 33. The plant was purchased by Holly Farms in 1963 for the processing of poultry products. The three (3) wastewater treatment lagoons to be closed were constructed in 1968 east of the plant facility to treat wastewater generated in the processing operation. The lagoons include one anaerobic lagoon (Lagoon No. 1) and two (2) unaerated lagoons for storage of waste activated sludge (Lagoon No. 3 and No. 4). The site is shown in Appendix I - Topographic Map of Lagoon Closure Area. The three (3) lagoons were constructed using on-site soils on the bottom and side slopes. At the time of construction, these soils were not tested for compaction or permeability. The effectiveness of these soils in preventing leakage is, therefore, questionable. Groundwater monitoring data gathered by Tyson Foods, Inc. in 1990 and 1991, indicates concentrations of certain pollutants to be elevated above background groundwater quality levels. Use of these lagoons will be discontinued after proposed improvements to the wastewater treatment system are completed in late 1992. A system of groundwater collection wells and well pumps will also be installed in 1992 to achieve groundwater remediation to background levels.

Sludge thickness measurements and sampling have also been performed in each lagoon. As shown in Appendix II, Lagoon

Sludge Accumulation Measurements, approximately 16.0 feet (259,000 ft^3) of accumulated sludge presently exists in sludge storage Lagoon No. 3 which is filled with solids. Approximately 1.5 feet of sludge (12,100 ft^3) exists on the bottom sludge storage Lagoon No. 4 which has a total depth of 12.5 feet.. Approximately 16.0 feet of accumulated bottom sludge and floating solids (300,000 ft^3) are present in existing Anaerobic Lagoon #1 which is filled with solids.

Testing of a representative composite sample of the sludge in each lagoon was performed and the results are enclosed in Appendix IV, Report of Laboratory Analysis of Accumulated Sludge Solids.

III. DESCRIPTION OF PROPOSED LAGOON CLOSURE PROCEDURE

The closure of the three lagoons at the Tyson Foods, Glen Allen, VA treatment plant site will be accomplished with sludge materials in place in the following steps:

1. After the proposed treatment system upgrade is completed and on-line, discontinue input of wastewater into the existing anaerobic lagoon and input of sludge into the two existing sludge lagoons.

2. The two existing 12" diameter inlet pipes into existing Anaerobic Lagoon #1 will be abandoned and plugged with concrete. The existing 4" diameter pipe inlets into Lagoons #3 and #4 will be abandoned and plugged with concrete. The existing 6" diameter overflow pipe from Lagoons #3 into Lagoon #5 will be abandoned and plugged with concrete. The 4" diameter sludge waste force main to Lagoons #3 and #4 will be plugged downstream of the tee connection and inlet control valve to the proposed new waste sludge lagoon and the old force main pipe to Lagoons #3 and #4 will be abandoned.

3. Gradually pump out liquid wastewater from all three lagoons into the treatment system for ultimate disposal; and, continue to pump out collected rainwater from the lagoons into the treatment system for ultimate disposal as necessary in the future.

4. Optionally pump out accumulated solids from each of the lagoons by a commercial sludge disposal company for ultimate disposal by land application on VA SWCB approved sites.

5. Regularly seed accumulated solids in the lagoons with commercially purchased Byo-Gon biological life activator (See Appendix V - Byo-Gon Activator Information) to attempt to accelerate the reduction of accumulated sludge solids volume by endogenous respiration.

6. Continue to monitor the quality of groundwater collected in the recovery wells, by analyzing on a quarterly frequency, samples pumped from the groundwater remediation recovery well system until groundwater pollutant levels are either reduced to background levels or to relatively stable levels which do not cause groundwater quality to be at risk.

7. Continue to monitor the levels of accumulated sludge in each lagoon to observe sludge volume reduction from endogenous respiration accomplished by dosage of Byo-Gon activator.

IV. POST CLOSURE MAINTENANCE PLAN

This proposed "materials in place" lagoon closure plan is not a "clean close" grade over plan but is essentially a long term lagoon management plan. This lagoon closure or management plan is especially suitable when accomplished simultaneously with the proposed Groundwater Remediation Plan in which groundwater will be collected, tested and recycled to the Tyson Foods, Glen Allen treatment plant for ultimate disposal.

This lagoon closure plan is proposed based on the assumption that discontinuing operation of these lagoons combined with lagoon solids volume reduction and lagoon supernatant disposal will eliminate further potential seepage of pollutants into the groundwater. This closure goal will be confirmed by on-going groundwater sampling and testing during the Groundwater Remediation Phase coupled with the backup protection of the groundwater collection, pumping, treatment, and disposal plan.

V. PROPOSED LAGOON CLOSURE SCHEDULE

	EVENT	DATE
1.	Complete construction and start-up of Groundwater Remediation Well System and begin initial groundwater collection phase prior to elimination of Operation of unlined treatment lagoons.	Aug. 15, 1992
2.	Complete construction of treatment plant upgrade and eliminate operation of unlined treatment lagoons.	March 15, 1993
3.	Commence liquid waste pump-out from the lagoons into the upgraded wastewater treatment system.	June 15, 1993
4.	Complete optional pump-out of accumulated solids from lagoon by commercial sludge disposal company.	Sept. 15, 1993
5.	Commence Byo-Gon activator dosage to reduce residual sludge volumes in lagoons.	April 1, 1994
6.	Discontinue Byo-Gon activator dosage into the lagoons.	April 1, 1995
7.	Monitor residual sludge characterisctics and accumulated sludge depths on each lagoon and pump out rainwater from lagoons to treatment system.	Commence on April 1, 1994 continue into future as required by VA SWCB

Groundwater Remediation Plan Letter of Approval with Conditions dated January 9, 1992

COMMONWEALTH of VIRGINIA

STATE WATER CONTROL BOARD

Richard N. Burton
Executive Director

4900 Cox Road

Gerard Seeley, Jr.
Regional Director

Please reply to: Piedmont Regional Office
P. O. Box 11143
Richmond, Virginia 23230
(804) 527-5020

January 9, 1992

Mr. John H. Reid
President
Reid Engineering Company, Inc.
1211 Caroline Street
Fredericksburg, Virginia 22401

RE: Tyson Foods, Inc., Glen Allen, Virginia
Ground Water Remediation Plan

Dear Mr. Reid:

The staff of the State Water Control Board has reviewed the supplement dated October 21, 1991 to the ground water remediation plan for Tyson Foods, Glen Allen. The proposed abatement procedures are technically adequate and the plan is approved subject to the following conditions:

1. Please confirm the pumping schedule for the recovery wells. The January 14, 1991 plan indicated that pumping was to be continuous at a rate of approximately 24 gallons per minute (2 gallons per minute per well). We understand that to mean that the recovery wells are to be pumped 24 hours per day, 7 days per week.

2. All monitoring reports are to be submitted by the tenth of the month following the monitoring period.

3. An annual status report is required in January 1993 and yearly thereafter, if necessary. A completion report is also required.

4. Regarding Appendix 3 -- Ground Water Remediation Plan Implementation Schedule, the monitoring following abatement must be done at least monthly for a period of 6 months. The perpetual monitoring, if needed, must be done on a quarterly basis.

5. The ground water monitoring program approved in March 1990 requires quarterly monitoring for a more comprehensive list of constituents than the indicator parameters cited in the October 21 submittal. The quarterly monitoring required by the March 1990 approval must continue. That monitoring will

also satisfy the needs of the abatement plan when the sample times coincide.

6. A Lagoon Closure Plan will be submitted for review and approval by February 14, 1992.

7. We reserve the right to require additional site assessment and site characterization if the need for such work is identified during the abatement program.

Please contact Ray Jenkins (527-5037) or B. N. Sinha (527-5054) if you have any questions.

Sincerely,

Gerard Seeley, Jr.
Regional Director

/rrj

cc: Mr. Larry C. Moyer -- Tyson Foods, Inc.

Reid Engineering Company, Inc.

703-371-8500
703-786-2733
FAX 703-371-8576

Consulting Environmental Engineers
Industrial Wastewater Treatment Specialists

1211 CAROLINE STREET, FREDERICKSBURG, VIRGINIA 22401

October 21, 1991

Mr. Ray Jenkins, Jr.
Environmental Engineer Senior
Piedmont Regional Office
State Water Control Board
Commonwealth of Virginia
4900 Cox Road
Innsbrook Corporate Center
P. O. Box 11143
Richmond, Virginia 23230

SUBJECT: TYSON FOODS, INC., GLEN ALLEN, VIRGINIA
GROUNDWATER REMEDIATION PLAN

Dear Ray:

As you requested in our meeting on September 25, 1991 concerning the proposed Tyson Foods, Glen Allen, Virginia groundwater remediation plan, this letter and attached groundwater contour map, aquifer analysis, and implementation schedule are submitted to the State Water Control Board to provide the additional information that you requested during our meeting.

As requested by Dr. Sinha, a groundwater contour map has been prepared and is attached in Appendix #1. This groundwater contour map clearly indicates a south to southeasterly flow of groundwater under the existing lagoons. This groundwater contour map also indicates that, at present, the unnamed tributary stream at the south end of the Glen Allen processing plant site is the present final discharge point for groundwater flow under the existing lagoons. The proposed groundwater remediation plan will call for the installation of twelve groundwater recovery wells across the south end of the new treatment plant site. Proper operation of this groundwater recovery-remediation system will result in elimination of contaminated groundwater flow into the unnamed tributary stream.

As emphasized by Mr. Bill Barker, hydrogeologist for Tyson Foods on this project, because the hydraulic gradient of the shallow groundwater slopes and flows toward the surface water in the unnamed tributary from both the North and South sides of the tributary, the present extent of groundwater contamination should be limited to the groundwater on the North side of the unnamed tributary stream and the stream flow itself. Also, because of the original topography of the site prior to construction of the treatment ponds, contaminant migration is unlikely East and West of the pond sites. Before construction of the ponds a large drainage swale existed directing runoff toward the unnamed tributary. This source of contaminated groundwater flow into the unnamed tributary stream should be eliminated by the proposed groundwater remediation plan.

As requested by Dr. Sinha, the groundwater remediation plan will be revised to use only existing upgradient Monitoring Well #1 as an indicator well for background groundwater quality.

As requested by Dr. Sinha, aquifer analysis including determinations of hydraulic gradient, hydraulic conductivity, transitivity and storativity are provided in Appendix #2. These analyses have been prepared by Mr. Bill Barker, P.G., Consulting Hydrogeologist for Tyson Foods, Inc. As noted in the discussion in Appendix #2 prepared by Mr. Barker, this hydrogeologic information indicates that the proposed recovery well system should be able to collect 100% of the groundwater flow from under the treatment plant lagoon site to the unnamed tributary located at the South boundary of the Tyson Foods processing site.

As requested, Reid Engineering Company has prepared a proposed Groundwater Remediation Plan Implementation Schedule which is contained in Appendix #3. Please be advised that this implementation schedule has used available hydrogeologic data for the Glen Allen site to prepare a rough estimate that approximately 15 months will be required from the time that wastewater inflow into the existing unlined treatment lagoons is eliminated to the point in time where the proposed groundwater collection and treatment program has resulted in the elimination of the entrance of further pollutants into the groundwater flow and the production of groundwater quality equal to the background quality of up-gradient Monitoring Well #1. The proposed groundwater remediation plan contains the following four phases:

1. Initial groundwater collection and pumping phase prior to elimination of operation of existing unlined waste treatment lagoons.

2. Groundwater remediation phase after new treatment system improvements are operational and further operation of existing unlined waste treatment lagoons is eliminated.

3. Post remediation phase with reduced groundwater monitoring schedule.

4. Perpetual monitoring phase with periodic groundwater monitoring.

As agreed in our meeting, the following parameters will be tested as indicator pollutants in the groundwater samples taken from MW #1, 2, 3 & 4 during all phases of the remediation plan:

Ammonia
TKN
TDS
Specific Conductivity
pH
Zinc

One composite sample of the combined pumped groundwater flow will also be obtained from the proposed new groundwater collection manhole for testing.

Reid Engineering Company will be submitting a Lagoon Closure Plan for the Glen Allen site to the State Water Control Board by mid December. As you noted in our meeting, the requirement for a Perpetual Monitoring Phase at the end of the remediation work will depend upon the closure method proposed by Tyson Foods, Inc. in the Lagoon Closure Plan.

As noted by Mike Motsinger, assistant processing plant manager at Glen Allen, Tyson Foods desires to obtain expedited approval of the proposed groundwater remediation plan from the Virginia State Water Control Board so that they can proceed with the installation and operation of the groundwater remediation recovery wells to improve groundwater quality as rapidly as possible. Tyson Foods desires to eliminate the seepage of contaminants from the existing

unlined lagoons; contain existing groundwater flow; and eliminate any negative effects of groundwater flow on receiving stream water quality by implementation and start-up of this groundwater collection, pumping and remediation plan by January 1, 1992 as noted on the proposed implementation schedule.

If you have questions or need additional information please call.

Best Regards,

REID ENGINEERING COMPANY, INC.

John H. Reid, P.E.
President

cc: Mike Motsinger
Larry Moyer
Danny Wyatt
Gene Newman
CTF28C08/JHR/ca

EVENT	DATE	TESTING SCHEDULE
1. Initial groundwater collection phase prior to elimination of operation of unlined treatment lagoons	Jan. 1, 1992	1/3 months
2. Complete construction of wastewater treatment system improvements and eliminate operation of unlined treatment lagoons	Oct. 1, 1992	1 test by Jan. 1, 1993
3. Groundwater Remediation Phase	Commence Jan. 1, 1993	1/month
4. Groundwater Remediation Phase by achieving groundwater equal to quality of upgradient MW #1	Jan. 1, 1994	1/month
5. Post remediation phase to confirm completion of remediation plan	Jan. 1, 1995	6 tests over 12 month period
6. Perpetual monitoring phase	No Completion Date	1/12 months

Attachment H: Whole Effluent Toxicity Evaluation

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4949-A Cox Road, Glen Allen, VA 23060-6296804/527-5020

SUBJECT: VA0004031 Tyson Farms, Inc. – Updated Toxicity Evaluation

TO: File

FROM: Janine Howard

DATE: January 15, 2015, updated March 16, 2015, updated August 10, 2015

Background: On October 1, 2014 DEQ staff met with Tyson representatives to discuss the draft permit package that was distributed to Tyson for owner review on August 25, 2014. Tyson expressed concern that the TMP Data Evaluation dated December 1, 2010, from which the new chronic toxicity limit was derived, was out of date and utilized data that was no longer representative of the facility's effluent quality. DEQ agreed to rerun the statistical analysis on the toxicity data using more recent data. All data that was available from 2009 to present was compiled and utilized for the updated evaluation.

Data Summary:

Table 1. Results of Chronic Toxicity Tests using *Ceriodaphnia dubia*

TEST DATE (start date)	NOEC		$T.U._C$		48 HR - LC_{50}	IC_{25}	SURVIVAL IN 100% EFFLUENT	TEST LAB
	Survival	Reproduction	Survival	Reproduction				
3-Feb-2009	100%	100%	1.00	1.00	>100%	>100%	100%	CBI
21-Apr-2009	100%	100%	1.00	1.00	>100%	>100%	100%	CBI
23-Jul-2009	100%	83%	1.00	1.20	>100%	>100%	100%	CBI
22-Oct-2009	100%	69%	1.00	1.45	>100%	72.20	70%	CBI
15-Jan-2013	100%	100%	1.00	1.00	>100%	>100%	100%	CBI
23-Apr-2013	100%	83%	1.00	1.20	>100%	58.7	100%	CBI
27-Aug 2013	100%	100%	1.00	1.00	>100%	>100%	100%	CBI
22-Oct 2013	100%	100%	1.00	1.00	>100%	>100%	90%	CBI
01-Feb-2015	100%	100%	1.00	1.00	>100%	>100%	100%	REIC
12-Apr-2015	100%	100%	1.00	1.00	>100%	85.38	100	REIC

Note: NR = Not Reported; CBI = Coastal Bioanalysts, Inc.; REIC = Research Environmental & Industrial Consultants, Inc.

Table 2. Results of Chronic Toxicity Tests using *Pimephales promelas*

TEST DATE (start date)	NOEC		$T.U._C$		48 HR - LC_{50}	IC_{25}	SURVIVAL IN 100% EFFLUENT	TEST LAB
	Survival	Growth	Survival	Growth				
23-Feb-2010	100%	100%	1.00	1.00	>100%	>100%	98%	CBI
4-May-2010	100%	100%	1.00	1.00	>100%	>100%	95%	CBI
17-Aug-2010	100%	100%	1.00	1.00	>100%	>100%	100%	CBI
19-Oct-2010	100%	100%	1.00	1.00	>100%	>100%	95%	CBI
12-Mar-2012	100%	100%	1.00	1.00	>100%	>100%	100%	CBI
12-Jun-2012	100%	100%	1.00	1.00	>100%	>100%	100%	CBI
16-Jul-2012	100%	100%	1.00	1.00	>100%	>100%	98%	CBI
23-Oct-2012	100%	100%	1.00	1.00	>100%	>100%	95%	CBI
4-Mar-2014	100%	83%	1.00	1.20	>100%	99.4%	100%	CBI
1-May 2014	100%	100%	1.00	1.00	>100%	>100%	100%	CBI
16-Sept-2014	100%	100%	1.0	1.0	>100%	>100%	95%	REIC
26-Oct-2014	100%	100%	1.0	1.0	>100%	>100%	92.5%	REIC

Note: MI = Meritech, Inc.; CBI = Coastal Bioanalysts, Inc.

Discussion: Statistical data evaluation was performed using STATS.exe. The test endpoints used in the data evaluation were the lowest NOEC's (converted to TU_C) reported for each of the paired chronic tests performed on a specific date. STATS.exe results are listed below.

2009 data through 2015
Chemical = WET-TUc (*C. dubia*)
Chronic averaging period = 4
WLAa = 3
WLAc = 1
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = 1.08542
Variance = .019845
C.V. = 0.129788
97th percentile daily values = 1.37263
97th percentile 4 day average = 1.22361
97th percentile 30 day average= 1.13380
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.12178812440083
Average Weekly Limit = 1.12178812440083
Average Monthly Limit = 1.12178812440083

The data are:
1 1
1 1
1.2 1

2013 data only
Chemical = WET-TUc (*C. dubia*)
Chronic averaging period = 4
WLAa = 3
WLAc = 1
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 4
Expected Value = 1.05
Variance = .3969
C.V. = 0.6
97th percentile daily values = 2.55508
97th percentile 4 day average = 1.74697
97th percentile 30 day average= 1.26635
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.46257478405323
Average Weekly Limit = 1.46257478405323
Average Monthly Limit = 1.46257478405323

The data are:
1
1.2
1

1.45 1 1 1.2	1
2010 through 2014 data **Chemical = WET- TUc (*P. promelas*)** Chronic averaging period = 4 WLAa = 3 WLAc = 1 Q.L. = 1 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 12 Expected Value = 1.01671 Variance = .002867 C.V. = 5.266816 97th percentile daily values = 1.12096 97th percentile 4 day average = 1.06796 97th percentile 30 day average= 1.03510 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Chronic Toxicity Maximum Daily Limit = 1.04962816462156 Average Weekly Limit = 1.04962816462156 Average Monthly Limit = 1.04962816462156 The data are: 1 1 1 1 1 1 1 1 1 1 1 1.2	**2012 through 2014** **Chemical = WET- TUc (*P. promelas*)** Chronic averaging period = 4 WLAa = 3 WLAc = 1 Q.L. = 1 # samples/mo. = 1 # samples/wk. = 1 Summary of Statistics: # observations = 4 Expected Value = 1.05 Variance = .3969 C.V. = 0.6 97th percentile daily values = 2.55508 97th percentile 4 day average = 1.74697 97th percentile 30 day average= 1.26635 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data A limit is needed based on Chronic Toxicity Maximum Daily Limit = 1.46257478405323 Average Weekly Limit = 1.46257478405323 Average Monthly Limit = 1.46257478405323 The data are: 1 1 1.2 1

As was the case during the 2010 evaluation, statistical evaluation of both species test end points resulted in limitation recommendations based on chronic toxicity. All of the NOEC test results for *P. promelas* were greater than the compliance endpoint in the previous permit, and thus reasonable potential for the toxicity of the discharge to this vertebrate species has not been demonstrated. In accordance with DEQ's earlier determination (see 12/1/2010 TMP memo), a limitation will not be based on these test results.

Due to the historic results where the NOEC fell below the compliance endpoint in the 2005 permit on multiple occasions, and a lack of newer data to demonstrate that the effluent toxicity has improved, a *C. dubia* limitation is again recommended for the permit reissuance. This is consistent with the earlier decision made in 2010 to include a chronic toxicity limit for *C. dubia* in the reissuance (see 12/1/10 memo).

A limitation recommendation of $TU_C = 1.12$ will be required in this permit reissuance.

Recommendation: In accordance with TMP Guidance 2000 (DEQ Guidance Memo No. 00-2012), data evaluation, and best professional judgment, it was determined that: 1) the facility continue conducting quarterly chronic toxicity tests (Chronic 3-Brood Static Renewal Survival and Reproduction Test using *C. dubia* until the WET limit is effective, and 2) a new WET limitation of NOEC = 89% and TU_C = 1.12 be established for *C. dubia* with a 4 year compliance schedule.

Refer to the 12/1/2010 TMP memorandum for the proposed permit language.

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office

4949-A Cox Road, Glen Allen, Virginia 23060 **804/527-5020**

TO: Deborah DeBiasi, State Coordinator Whole Effluent Toxicity Program, OWPCA
FROM: Tamira Cohen, PRO Environmental Engineer, Sr.
DATE: December 1, 2010
SUBJECT: TMP Data Evaluation and Review for Tyson Foods/Tyson Farms, VA0004031
COPIES: File

Facility Name:	**Tyson Farms, Inc. DBA Tyson Foods, Inc. – Glen Allen Complex**
Permit Number:	**VA0004031**
Maximum 30-day Effluent Flow:	**2.067 MGD**
Design Flow:	**1.25 MGD**
Receiving Stream:	**UT to Chickahominy River**
Instream Waste Concentration (IWC):	**100%**
Facility SIC:	**2015**

Facility Description:

The Tyson Foods – Glen Allen Complex is processed as an industrial minor facility. The industrial discharge consists of treated wastewater resulting from the operations at a poultry processing facility (slaughter, meat cut preparations, packaging for human consumption and poultry processing for pet food), facility cleaning operations, and facility domestic sanitary waste.

Facility Requirements:

The current permit (expired November 13, 2010) requires quarterly Whole Effluent Toxicity (WET) testing (Chronic 3-Brood Static Renewal Survival and Reproduction Test, *Ceriodaphnia dubia* in odd numbered years) and (Chronic 7-Day Static Renewal Survival and Growth Test, *Pimephales promelas* in even numbered years). The special condition set the criteria of NOEC = 69% or TU_C of 1.44.

Data Summary:

This data review includes the results of 11 and 10 sets of quarterly testing for each of *Ceriodaphnia dubia* and *Pimephales promelas*, respectively. Testing was performed by Meritech, Inc. (2005 to 2007) and then Coastal Bioanalysts, Inc. (2007 to 2010). All tests were conducted in accordance with approved protocol.

Results of Chronic Toxicity Tests using *Ceriodaphnia dubia*

TEST DATE (start date)	NOEC		T.U.$_C$		48 HR - LC_{50}	IC_{25}	SURVIVAL IN 100% EFFLUENT	TEST LAB
	Survival	Reproduction	Survival	Reproduction				
13-Dec-2005	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	NR	MI
16-Jan-2007	75%	**23%**	1.33	**4.35**	>100%	34.50	60%	MI
21-Mar-2006	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	NR	MI
20-Mar-2007	100%	**45%**	1.00	**2.22**	79.5	>100%	NR	MI
22-May-2007	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	90%	MI
10-Jul-2007	**100%**	**100%**	**1.00**	**1.00**	>100%	87.90	80%	CBI
7-Nov-2007	100%	**69%**	1.00	**1.44**	>100%	72.80	100%	CBI
3-Feb-2009	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	100%	CBI
21-Apr-2009	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	100%	CBI
23-Jul-2009	100%	**83%**	1.00	**1.20**	>100%	>100%	100%	CBI
22-Oct-2009	100%	**69%**	1.00	**1.45**	>100%	72.20	70%	CBI

Note: NR = Not Reported; MI = Meritech, Inc.; CBI = Coastal Bioanalysts, Inc.

Results of Chronic Toxicity Tests using *Pimephales promelas*

TEST DATE (start date)	NOEC		T.U.$_C$		48 HR - LC_{50}	IC_{25}	SURVIVAL IN 100% EFFLUENT	TEST LAB
	Survival	Growth	Survival	Growth				
16-May-2006	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	100%	MI
22-Aug-2006	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	100%	MI
23-Jan-2007	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	100%	MI
14-Oct-2008	**83%**	**83%**	**1.20**	**1.20**	>100%	>100%	85%	CBI
15-Jul-2008	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	100%	CBI
24-Jun-2008	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	100%	CBI
13-Mar-2008	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	100%	CBI
17-Aug-2010	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	100%	CBI
4-May-2010	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	95%	CBI
23-Feb-2010	**100%**	**100%**	**1.00**	**1.00**	>100%	>100%	98%	CBI

Note: MI = Meritech, Inc.; CBI = Coastal Bioanalysts, Inc.

Discussion:

Statistical data evaluation was performed using STATS.exe. The test endpoints used in the data evaluation were the lowest NOEC's (converted to TU_C) reported for each of the paired chronic tests performed on a specific date. These test endpoints were consistently the reproduction TU_C in *C. dubia* and growth TU_C in *P. promelas*. STATS.exe results are listed below.

Chemical = WET – TU_C (*C. dubia*)	**Chemical = WET – TU_C (*P. promelas*)**
Chronic averaging period = 4	Chronic averaging period = 4
WLAa = 3	WLAa = 3
WLAc = 1	WLAc = 1
Q.L. = 1	Q.L. = 1
# samples/mo. = 1	# samples/mo. = 1
# samples/wk. = 1	# samples/wk. = 1
Summary of Statistics:	Summary of Statistics:
# observations = 11	# observations = 10
Expected Value = 1.48973	Expected Value = 1.02009
Variance = 0.540259	Variance = 0.003464
C.V. = 0.493393	C.V. = 5.770308
97th percentile daily values = 3.21446	97th percentile daily values = 1.13505
97th percentile 4 day average = 2.28474	97th percentile 4 day average = 1.07652
97th percentile 30 day average= 1.74215	97th percentile 30 day average= 1.04030
# < Q.L. = 0	# < Q.L. = 0
Model used = lognormal	Model used = lognormal
A limit is needed based on Chronic Toxicity	A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.40692274293467	Maximum Daily Limit = 1.05437147183784
Average Weekly limit = 1.40692274293467	Average Weekly Limit = 1. 05437147183784
Average Monthly Limit = 1.40692274293467	Average Monthly Limit = 1. 05437147183784
The data (TU_C) are:	The data (TU_C) are:
1	1
4.35	1
1	1
2.22	1.2
1	1
1	1
1.44	1
1	1
1	1
1.2	1
1.45	

Statistical evaluation of both species test end points resulted in limitation recommendations based on chronic toxicity. Toxicity of the discharge to *C. dubia* has been demonstrated and a limitation recommendation of NOEC = 72% and TU_C = 1.38 will be required in this permit reissuance. All of the 10 NOEC test results for *P. promelas* were greater than the compliance endpoint in the previous permit, and thus reasonable potential for the toxicity of the discharge to this vertebrate species has not been demonstrated. One of the test results reported was less than the chronic NOEC of 100% (reported as 83%). Using best professional judgment, a limitation will not be based on these test results.

Recommendations:

In accordance with TMP Guidance 2000 (DEQ Guidance Memo No. 00-2012), data evaluation, and best professional judgment, it was determined that: 1) the facility continue conducting quarterly chronic toxicity tests (Chronic 3-Brood Static Renewal Survival and Reproduction Test using *C. dubia* until the WET limit

is effective 2) a new WET limitation of NOEC = 72% and TU_C = 1.38 be established for *C. dubia* with a 4 year compliance schedule.

(1) WET testing permit section to be included in current permit reissuance is as follows:

C. WHOLE EFFLUENT TOXICITY (WET) LIMITATION REQUIREMENTS

1. The Whole Effluent Toxicity limitation of $\leq$1.38 TU_C (NOEC$\geq$72%) in Part I.A. is a final limit with an effective date of 4 years from the effective date of this permit.

2. Commencing within the first month after the effective date of the limit, the permittee shall conduct quarterly Chronic 3-Brood Static Renewal Survival and Reproduction Tests using *Ceriodaphnia dubia* using 24-hour flow-proportioned composite samples of final effluent from outfall 001.

   These chronic tests shall be conducted in such a manner and at sufficient dilutions (minimum of five dilutions, derived geometrically) to determine the "No Observed Effect Concentration" (NOEC) for survival and reproduction. The test endpoint (72%) must be represented by a dilution, and if other than 100%, should be bracketed by at least one dilution above and one dilution below it. Results which cannot be determined (i.e., a “less than” NOEC value) are not acceptable, and a retest will have to be performed. A retest of a non-acceptable test must be performed during the same compliance period as the test it is replacing. Express the test NOEC as TU_c (Chronic Toxic Units), by dividing 100/NOEC for DMR reporting. The IC_{25} should be included on the submitted test reports. A copy of the toxicity test results shall be submitted with the DMR. Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3.

3. The permit may be modified or revoked and reissued to include pollutant specific limits in lieu of a WET limit should it be demonstrated that toxicity is due to specific parameters.

4. The permittee shall report the results on the quarterly DMR and submit a copy of each toxicity test report in accordance with the following schedule:

Test Period	Test Period Dates	DMR/Report Due Date
Quarter 1	Jan 1 – March 31, 2011	Apr 10, 2011
Quarter 2	Apr 1 – Jun 30, 2011	Jul 10, 2011
Quarter 3	Jul 1 – Sep 30, 2011	Oct 10, 2011
Quarter 4	Oct 1 – Dec 31, 2011	Jan 10, 2012
Quarter 5	Jan 1 – March 31, 2012	Apr 10, 2012
Quarter 6	Apr 1 – Jun 30, 2012	Jul 10, 2012
Quarter 7	Jul 1 – Sep 30, 2012	Oct 10, 2012
Quarter 8	Oct 1 – Dec 31, 2012	Jan 10, 2013
Quarter 9	Jan 1 – March 31, 2013	Apr 10, 2013
Quarter 10	Apr 1 – Jun 30, 2013	Jul 10, 2013
Quarter 11	Jul 1 – Sep 30, 2013	Oct 10, 2013
Quarter 12	Oct 1 – Dec 31, 2013	Jan 10, 2014
Quarter 13	Jan 1 – March 31, 2014	Apr 10, 2014
Quarter 14	Apr 1 – Jun 30, 2014	Jul 10, 2014
Quarter 15	Jul 1 – Sep 30, 2014	Oct 10, 2014
Quarter 16	Oct 1 – Dec 31, 2014	Jan 10, 2015
Quarter 17	Jan 1 – March 31, 2015	Apr 10, 2015
Quarter 18	Apr 1 – Jun 30, 2015	Jul 10, 2015
Quarter 19	Jul 1 – Sep 30, 2015	Oct 10, 2015
Quarter 20	Oct 1 – Dec 31, 2015	Jan 10, 2016

(2) WET testing permit section to be included in current permit reissuance is as follows:

D. WHOLE EFFLUENT TOXICITY (WET) MONITORING REQUIREMENTS

1. Within the first quarter after the effective date of the permit, the permittee shall conduct quarterly chronic toxicity tests on Outfall 001 using 24-hour flow-proportioned composite samples until the WET limit of Part 1.A. is effective. The test to use is the Chronic 3-Brood Survival and Reproduction Static Renewal Test using *Ceriodaphnia dubia.*

2. These chronic tests shall be conducted in such a manner and at sufficient dilutions (minimum of five dilutions, derived geometrically) to determine the "No Observed Effect Concentration" (NOEC) for survival and reproduction. Results which cannot be quantified (i.e., a “less than” NOEC value) are not acceptable, and a retest will have to be performed. A retest of a non-acceptable test must be performed during the same compliance period as the .test it is replacing. Express the test NOEC as TU_c (Chronic Toxic Units), by dividing 100/NOEC for DMR reporting. Report the LC_{50} at 48 hours and the IC_{25} with the NOEC in the test report.

   The permittee may provide additional samples to address data variability. These data shall be reported and may be included in the evaluation of effluent toxicity. Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3.

3. The test dilutions should be able to determine compliance with the following endpoints:

   Chronic NOEC of ≥72% equivalent to a TU_C of ≤1.38

4. The permit may be modified or revoked and reissued to include pollutant specific limits in lieu of a WET limit should it be demonstrated that toxicity is due to specific parameters. The pollutant specific limits must control the toxicity of the effluent.

5. The permittee shall report the results on the quarterly DMR and submit a copy of each toxicity test report in accordance with the following schedule:

Test Period	Test Period Dates	DMR/Report Due Date
Quarter 1	Jan 1 – Mar 31, 2011	Apr 10, 2011
Quarter 2	Apr 1 – Jun 30, 2011	Jul 10, 2011
Quarter 3	Jul 1 – Sep 30, 2011	Oct 10, 2011
Quarter 4	Oct 1 – Dec 31, 2011	Jan 10, 2012
Quarter 5	Jan 1 – Mar 31, 2012	Apr 10, 2012
Quarter 6	Apr 1 – Jun 30, 2012	Jul 10, 2012
Quarter 7	Jul 1 – Sep 30, 2012	Oct 10, 2012
Quarter 8	Oct 1 – Dec 31, 2012	Jan 10, 2013
Quarter 9	Jan 1 – Mar 31, 2013	Apr 10, 2013
Quarter 10	Apr 1 – Jun 30, 2013	Jul 10, 2013
Quarter 11	Jul 1 – Sep 30, 2013	Oct 10, 2013
Quarter 12	Oct 1 – Dec 31, 2013	Jan 10, 2014
Quarter 13	Jan 1 – Mar 31, 2014	Apr 10, 2014
Quarter 14	Apr 1 – Jun 30, 2014	Jul 10, 2014
Quarter 15	Jul 1 – Sep 30, 2014	Oct 10, 2014
Quarter 16	Oct 1 – Dec 31, 2014	Jan 10, 2015
Quarter 17	Jan 1 – Mar 31, 2015	Apr 10, 2015
Quarter 18	Apr 1 – Jun 30, 2015	Jul 10, 2015
Quarter 19	Jul 1 – Sep 30, 2015	Oct 10, 2015
Quarter 20	Oct 1 – Dec 31, 2015	Jan 10, 2016

(3) Part I.A. section to be included in current permit reissuance is as follows:

A. LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning with the permit's effective date and lasting until the permit's expiration date, the permittee is authorized to discharge from Outfall **001**.

a. Such discharges shall be limited and monitored by the permittee as specified below:

	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
EFFLUENT CHARACTERISTICS	**MONTHLY AVERAGE**	**WEEKLY AVERAGE**	**MINIMUM**	**MAXIMUM**	**FREQUENCY**	**SAMPLE TYPE**
720 Toxicity, Chronic (TU_C)[*C.dubia*][(1)] (Interim)	NA	NA	NA	NA	1/Quarter	24 HC
720 Toxicity, Chronic (TU_C)[*C.dubia*][(2)(3)] (Final)	NA	NA	NA	1.38	1/Quarter	24 HC

NA = Not Applicable 24HC = 24-Hour Composite

Notes:
(1) See Part I.D. for monitoring requirements for Whole Effluent Toxicity.
(2) See Part I.C. for limit requirements for Whole Effluent Toxicity.
(3) See Part I.B.X. for Schedule of Compliance.

(3) Part I.B.X section to be included in current permit reissuance is as follows:

B.X. COMPLIANCE SCHEDULE FOR CHRONIC WHOLE EFFLUENT TOXICITY LIMIT

The permittee shall achieve compliance with the final limit for Chronic Whole Effluent Toxicity as specified in Part I.A.1 in this permit in accordance with the following schedule:

SCHEDULE OF COMPLIANCE FOR CHRONIC WHOE EFFLUENT TOXICITY		
1.	Prepare progress reports.	Annually beginning 1 year from the permit effective date.
2.	Achieve compliance with the final effluent limitation for Final Chronic Whole Effluent Toxicity.	No later than 4 years from the permit effective date.

No later than 14 calendar days following the dates identified in the above schedules of compliance, the permittee shall submit to the Piedmont Regional Office, either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 01/10/05
File: WETLIM10.xls
(MIX.EXE required also)

Acute Endpoint/Permit Limit — **Use as LC_{50} in Special Condition, as TUa on DMR**

ACUTE	100% =	NOAEC	LC_{50} =	NA	% Use as	NA	TUa
ACUTE WLAa		0.3	Note: Inform the permittee that if the mean of the data exceeds this TUa:	1.0	a limit may result using WLA.EXE		

Chronic Endpoint/Permit Limit — **Use as NOEC in Special Condition, as TUc on DMR**

CHRONIC	1.40691066	TU_c	NOEC =	72	% Use as	1.38	TU_c
BOTH*	3	TU_c	NOEC =	34	% Use as	2.94	TU_c
AML	1.40691066	TU_c	NOEC =	72	% Use as	1.38	TU_c

ACUTE WLAa,c	3	Note: Inform the permittee that if the mean	
CHRONIC WLAc	1	of the data exceeds this TUc:	1.0
* Both means acute expressed as chronic		a limit may result using WLA.EXE	

Enter data in the cells with blue type:

Entry Date:	12/01/10				
Facility Name:	Tyson Foods - Glen Allen				
VPDES Number:	VA0004031				
Outfall Number:	001				
		% Flow to be used from MIX.EXE		**Difuser /modeling study?**	
Plant Flow:	2.067 MGD			Enter Y/N	N
Acute 1Q10:	0 MGD	100 %		Acute	1 :1
Chronic 7Q10:	0 MGD	100 %		Chronic	1 :1

Are data available to calculate CV? (Y/N) **y** (Minimum of 10 data points, same species, needed) Go to Page 2
Are data available to calculate ACR? (Y/N) **n** (NOEC<LC50, do not use greater/less than data) Go to Page 3

NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use

IWC_a	100 %	Plant flow/plant flow + 1Q10	
IWC_c	100 %	Plant flow/plant flow + 7Q10	
Dilution, acute	1	100/IWCa	
Dilution, chronic	1	100/IWCc	
WLA_a	0.3	Instream criterion (0.3 TUa) X's Dilution, acute	
WLA_c	1	Instream criterion (1.0 TUc) X's Dilution, chronic	
$WLA_{a,c}$	3	ACR X's WLA_a - converts acute WLA to chronic units	
ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)	
CV-Coefficient of variation	0.493373209	Default of 0.6 - if data are available, use tables Page 2)	
Constants eA	0.46345743	Default = 0.41	
eB	0.652043199	Default = 0.60	
eC	2.157695476	Default = 2.43	
eD	2.157695476	Default = 2.43 (1 samp) No. of samples 1	

****The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.**

$LTA_{a,c}$	1.39037229	WLAa,c X's eA						
LTA_c	0.652043199	WLAc X's eB				Rounded NOEC's		%
MDL** with $LTA_{a,c}$	3	TU_c	NOEC =	33.333333	(Protects from acute/chronic toxicity)	NOEC =	34	%
MDL** with LTA_c	1.40691066	TU_c	NOEC =	71.077719	(Protects from chronic toxicity)	NOEC =	72	%
AML with lowest LTA	1.40691066	TU_c	NOEC =	71.077719	Lowest LTA X's eD	NOEC =	72	

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

							Rounded LC50's		%
MDL with $LTA_{a,c}$	0.3	TU_a	LC50 =	333.333333	%	Use NOAEC=100%	LC50 =	NA	%
MDL with LTA_c	0.140691066	TU_a	LC50 =	710.777186	%	Use NOAEC=100%	LC50 =	NA	

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

Coefficient of Variation for effluent tests

CV = 0.493373209 (Default 0.6)

δ^2 = 0.217863334

δ = 0.466758325

Using the log variance to develop eA
(P. 100, step 2a of TSD)

Z = 1.881 (97% probability stat from table

A = -0.76904074

eA = 0.46345743

Using the log variance to develop eB
(P. 100, step 2b of TSD)

δ_4^2 = 0.059074509

δ_4 = 0.243052482

B = -0.42764446

eB = 0.652043199

Using the log variance to develop eC
(P. 100, step 4a of TSD)

δ^2 = 0.217863334

δ = 0.466758325

C = 0.769040743

eC = 2.157695476

Using the log variance to develop eD
(P. 100, step 4b of TSD)

n = **1** This number will most likely stay as "1", for 1 sample/month.

δ_n^2 = 0.217863334

δ_n = 0.466758325

D = 0.769040743

eD = 2.157695476

	Vertebrate IC_{25} Data or LC_{50} Data	LN of data	Invertebrate IC_{25} Data or LC_{50} Data	LN of data
	**********		**********	
1			1.00	0.000000
2			4.35	1.469676
3			1.00	0.000000
4			2.22	0.798508
5			1.00	0.000000
6			1.00	0.000000
7			1.44	0.364643
8			1.00	0.000000
9			1.00	0.000000
10			1.20	0.182322
11			1.45	0.371564
12				
13				
14				
15				
16				
17				
18				
19				
20				
St Dev	NEED DATA	NEED DATA	St Dev	1.0112116	0.4667583
Mean	0	0	Mean	1.5145498	0.2897011
Variance	0	0.000000	Variance	1.022549	0.217863
CV	0		CV	0.4933732	

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	Invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
				ACR for vertebrate data:			0

Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

Table 3. ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50,

enter it here: NO DATA %LC_{50}

NO DATA TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	100	1.0		
Dilution series to use for limit			72	1.3888889
Dilution factor to recommend:	0.5		0.8485281	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	50.0	2.00	84.9	1.18
	25.0	4.00	72.0	1.39
	12.5	8.00	61.1	1.64
	6.25	16.00	51.8	1.93
Extra dilutions if needed	3.12	32.05	44.0	2.27
	1.56	64.10	37.3	2.68

Cell: I9
Comment:
This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Attachment I: NPDES Industrial Permit Rating Work Sheet

NPDES PERMIT RATING WORK SHEET

☐ Regular Addition
☐ DiscretionaryAddition
☐ Score change, but no status change
☐ Deletion

NPDES NO. VA0004031

Facility Name: Tyson Farms, Inc.

City: Glen Allen, VA

Receiving Water: Chickahominy River, UT

Reach Number: Outfall 001 2-XDD001.12; Outfall 002 2-XDD000.95

Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?
1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate

☐ YES; score is 600 (stop here) X NO (continue)

Is this permit for a municipal separate storm sewer serving a population greater than 100,000?

☐ YES; score is 700 (stop here)
X NO (continue)

FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: _____ Primary SIC Code: 2015 Other SIC Codes:
Industrial Subcategory Code: 000 (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	15	☐ 7.	7	35
X 1.	1	5	☐ 4.	4	20	☐ 8.	8	40
☐ 2.	2	10	☐ 5.	5	25	☐ 9.	9	45
			☐ 6.	6	30	☐ 10.	10	50

Code Number Checked: 1

Total Points Factor 1: 5

FACTOR 2: Flow/Stream Flow Volume (*Complete either Section A or Section B; check only one)*

Section A ☐ Wastewater Flow Only Considered

Wastewater Type (See Instructions)		Code	Points
Type I: Flow < 5 MGD	☐	11	0
Flow 5 to 10 MGD	☐	12	10
Flow > 10 to 50 MGD	☐	13	20
Flow > 50 MGD	☐	14	30
Type II: Flow < 1 MGD	☐	21	10
Flow 1 to 5 MGD	X	22	20
Flow > 5 to 10 MGD	☐	23	30
Flow > 10 MGD	☐	24	50
Type III: Flow < 1 MGD	☐	31	0
Flow 1 to 5 MGD	☐	32	10
Flow > 5 to 10 MGD	☐	33	20
Flow > 10 MGD	☐	34	30

Section B ☐ Wastewater and Stream Flow Considered

Wastewater Type (See Instructions)	Percent of instream Wastewater Concentration at Receiving Stream Low Flow		Code	Points
Type I/III:	< 10 %	☐	41	0
	10 % to < 50 %	☐	42	10
	> 50 %	☐	43	20
Type II:	< 10 %	☐	51	0
	10 % to <50 %	☐	52	20
	> 50 %	☐	53	30

Code Checked from Section A or B: 22
Total Points Factor 2: 20

FACTOR 3: Conventional Pollutants NPDES NO: VA0004031

(only when limited by the permit)

A. Oxygen Demanding Pollutant: (check one) XBOD ☐ COD ☐ Other:_____

			Code	*Points*
Permit Limits: (check one)	X	< 100 lbs/day	1	0
	☐	100 to 1000 lbs/day	2	5
	☐	> 1000 to 3000 lbs/day	3	15
	☐	> 3000 lbs/day	4	20

Code Checked: _NA____

Daily max 8mg/L X1.25 MDG X 8.34lbs/MG/mg/L = 83.4 lbs

Points Scored: _0____

B. Total Suspended Solids (TSS)

			Code	*Points*
Permit Limits: (check one)	X	< 100 lbs/day	1	0
	☐	100 to 1000 lbs/day	2	5
	☐	> 1000 to 5000 lbs/day	3	15
	☐	> 5000 lbs/day	4	20

Code Checked: _1____

Daily max 7.5mg/L X1.25 MDG X 8.34lbs/MG/mg/L = 78.2 lbs

Points Scored: __0___

C. Nitrogen Pollutant: (check one) X Ammonia ☐ Other: _____

		Nitrogen Equivalent	*Code*	*Points*
Permit Limits: (check one)	X	< 300 lbs/day	1	0
	☐	300 to 1000 lbs/day	2	5
	☐	> 1000 to 3000 lbs/day	3	15
	☐	> 3000 lbs/day	4	20

Daily max 8mg/L X1.25 MDG X 8.34lbs/MG/mg/L = 83.4 lbs

Code Checked: _1____

Points Scored: __0___

Total Points Factor 3: __0___

FACTOR 4: Public Health Impact

Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.

☐ YES (If yes, check toxicity potential number below)

X NO (If no, go to Factor 5)

Determine the *human health* toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column ☐ check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	0	☐ 7.	7	15
☐ 1.	1	0	☐ 4.	4	0	☐ 8.	8	20
☐ 2.	2	0	☐ 5.	5	5	☐ 9.	9	25
			☐ 6.	6	10	☐ 10.	10	30

Code Number Checked: ___NA__

Total Points Factor 4:__0___

FACTOR 5: Water Quality Factors NPDES NO.

A. Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge:

		Code	Points
X	Yes	1	10
☐	No	2	0

B. Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?

		Code	Points
X	Yes	1	0
☐	No	2	5

C. Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?

		Code	Points
X	Yes	1	10
☐	No	2	0

Code Number Checked: A 1 B 1 C 1

Points Factor 5: A 10 + B 0 + C 10 = 20 TOTAL

FACTOR 6: Proximity to Near Coastal Waters

A. Base Score: Enter flow code here (from Factor 2): 22 *Enter the multiplication factor that corresponds to the flow code:* 0.30

Check appropriate facility HPRI Code (from PCS):

	HPRI#	*Code*	*HPRI Score*
☐	1	1	20
☐	2	2	0
☐	3	3	30
X	4	4	0
☐	5	5	20

HPRI code checked: 4

Flow Code	*Multiplication Factor*
11, 31, or 41	0.00
12, 32, or 42	0.05
13, 33, or 43	0.10
14 or 34	0.15
21 or 51	0.10
22 or 52	0.30
23 or 53	0.60
24	1.00

Base Score: (HPRI Score) 0 X (Multiplication Factor) 0.30 = 0 (TOTAL POINTS)

B. Additional Points ☐ NEP Program
For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?

	Code	Points
☐ Yes	1	10
☐ No	2	0

NA

Code Number Checked:

C. Additional Points ☐ Great Lakes Area of Concern
For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see Instructions)

	Code	Points
☐ Yes	1	10
☐ No	2	0

NA

A 4 B NA C NA

Points Factor 6: A 0 + B NA + C NA = 0 TOTAL

SCORE SUMMARY NPDES NO.

Factor	Description	Total Points
1	Toxic Pollutant Potential	5
2	Flows/Streamflow Volume	30
3	Conventional Pollutants	0
4	Public Health Impacts	0
5	Water Quality Factors	20
6	Proximity to Near Coastal Waters	0
	TOTAL (Factors 1 through 6)	55

S1. Is the total score equal to or greater than 80? ☐ Yes (Facility is a major) X No

S2. If the answer to the above questions is no, would you like this facility to be discretionary major?

X No

☐ Yes (Add 500 points to the above score and provide reason below:

Reason:

NEW SCORE: 55

OLD SCORE: 55

Janine Howard
Permit Reviewer's Name

(804) 698-4299
Phone Number

April 15, 2014
Date

Attachment J: Stormwater Flow Evaluation Report and Drainage Maps

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June 10, 2015

Cardno, Inc.

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Mr. Tim Lockhart
EHS Manager
Tyson Foods – Glen Allen Complex
13264 Mountain Road
Glen Allen, VA 23059

RE: **Stormwater Flow Evaluation Report**
Tyson Foods Glen Allen Complex
Cardno Project TF001

Dear Mr. Lockhart:

Per your request Cardno is pleased to provide this report describing our stormwater flow evaluation for the referenced Facility. The purpose of the evaluation was to review the Facility's permitted storm water flows with respect to the potential for contacting or mixing with the plant's process water. The scope of services, as originally outlined in our January 23, 2015 proposal, included the following tasks:

1. Compile a map of storm water watersheds and drainage patterns across the entire site based on aerial photography, publically-available LIDAR topographic survey data and client-provided information;
2. Inventory, describe and document storm water sources within each watershed; and,
3. Document the absence of contact between storm water and process water flows.

The work performed and findings for each task are described herein.

Information Review
The following data sources were reviewed for this project:

1. http://www.hanovercountygis.org/ (GIS Topography);
2. January 15, 2014 Facility Stormwater Pollution Prevention Plan (SWPPP);
3. Sheet M2, Drainage Areas, Site Plan and Erosion & Sediment Control Plan, Reid Engineering circa 1992 (SWM Map); and,
4. May 7, 2015 site visit (Site Visit).

The information collected was used to compile the two attached maps; Water Management Site Plan (**Figure 1**), and Water Management Site Plan Insets (**Figure 2**).

Storm Water Management Mapping

GIS Topography suggests that storm water drains to a central surface water feature that crosses

the Site from north to south, with some storm flow directed to a drainage way located along the southern boundary, as illustrated on **Figure 1**. The central drainage feature is identified in the SWPPP as an unnamed tributary to the Chickahominy River. These general conditions were confirmed during the Site Visit.

The Facility's SWPPP describes seven (7) areas for the purposes of storm water management. These are identified as:

Area 1 - Employee Parking/Front Office Parking

Area 2 - Live Receiving/Pet Food Loading/Wet Dock

Area 3 - Pet Food Refrigeration/Hydraulic Room/Boiler Room/Offal Room/Maintenance Shop/Maintenance Shed/Pallet Storage Shed/Chemical Storage Shed/Drummed Petroleum Storage Area

Area 4 - Main Plant Refrigeration/Shipping and Labeling

Area 5 - Service Center/Fueling Bay/Wash Bay/Pump House

Area 6 - Wastewater Treatment Plant (WWTP)

Area 7 – Live Holding Shed/Chicken Trailer Staging/Remote Trailer Parking

The extents of each area were illustrated on the SWM Map listed as reference 3, and are shown on **Figure 1**.

In general, storm water flow within each SWM area is either directed to flow to collection points for treatment prior to discharge, or directed to flow directly to a surface water feature. The SWM management systems include structures that collect stormwater and direct it to the process water piping system for treatment at the WWTP, a bioretention cell (BMP-14) to treat stormwater prior to discharge to surface water, and a stormwater pipe network that discharges directly to surface water.

Regarding the stormwater structures that transmit storm water to the process water treatment system, it is our understanding that these inverts are normally open to receive storm water flow. Further, it is our understanding that BMP-12 located in Area 2, remote trailer parking, may be covered for brief periods of time in advance of hurricane storm conditions.

These features and SWM for each area are illustrated on **Figures 1 and 2**, and are summarized below.

Area 1

Stormwater from the employee parking area is directed to a drop inlet (DI-3) where it enters storm sewer piping that discharges to the central surface water feature to the east. Stormwater from the front office parking area is directed to DI-1, where it enters process water piping for treatment by the WWTP. Storm water from these areas is considered to be non-contact water with respect to Facility processes.

Area 2

Area 2 includes Live Receiving/Wet Dock operational activities where live, or unprocessed product is handled on the north side of the Facility as shown on **Figure 1**. A close up of this area is shown on **Figure 2, Inset 1**. Storm water that falls on these activities is collected by DI-2, DI-9, Pit Pump and trench drain (BMP-5) where it enters the process water piping network for treatment at the WWTP.

In the parking area beyond the loading/receiving docks, storm water is directed to flow to a bioretention cell (BMP-14) for treatment prior to discharge to surface water. BMP-14 was constructed to manage potential incidental contact with fecal residue that might occur as delivery trucks are moved through the area.

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Area 3

Storm water in Area 3 does not come in contact with unprocessed product. Storm water in this area is directed to DI-5, DI-10 and/or wet wells 1 and 2 (WW-1 &2), where it enters the process water pipe network for treatment by the WWTP.

Area 4

Storm water in Area 4 does not come in contact with unprocessed product. Storm water in this area is directed to DI-15A-15B-15C or to DI-13 where it enters the storm sewer piping prior to discharge to surface water.

Area 5

Storm water in Area 5 does not come in contact with unprocessed product. Storm water in this area is directed to DI-12 or to the east where it discharges to surface water.

Area 6

Storm water in Area 6 falls on the WWTP operations area, does not come in contact with unprocessed product. Storm water in this area either falls directly into self-contained treatment units where it enters the treatment process or it falls on non-contact areas where it discharges to surface water.

Area 7

Area 7 includes the live holding shed/chicken trailer staging and remote trailer parking areas, where stormwater could come in contact with unprocessed product or iced product drippings. Close-ups of these areas are shown on **Figure 2, Insets 2 and 3.**

At the remote trailer parking area, stormwater is directed to a sloped concrete pad with invert (BMP-14), where it enters the process water system and is treated by the WWTP.

At the live holding shed, live product trailers are parked under roof so as to not be in contact with stormwater. Drips and fecal matter falling from the trailers are directed via sloped concrete pad to a central trench drain (BMP-12) where the flow enters the process water piping and treatment system and is treated by the WWTP.

In the area to the south of the shed, storm water is directed toward BMP-14 (bioretention cell) where it is treated prior to discharge to surface water. BMP-14 was constructed to manage potential incidental contact with fecal residue that might occur as delivery trucks are moved through the area.

Evaluation of Contact Potential

The following observations are made with respect to the potential for stormwater to be exposed to fecal matter and/or E. coli bacteria that originate from Facility activities under normal operating conditions:

- Of the seven SWM areas, only Areas 2 and 7 exhibit conditions where storm water flow could come in contact with bacteria originating from Facility operations.
- For Area 2, all storm water that falls on the product handling area is directed to storm water structures that connect to process water piping for treatment at the Facility WWTP. Storm water that falls outside of the product handling area is directed to BMP-14 for treatment by the bioretention cell.
- For Area 7, storm water that falls on product handling areas is either isolated from the process by a roofing system, or is collected and directed to the process water system for treatment at the WWTP. Storm water that falls outside of the product handling area where live product delivery trucks are moved is directed to BMP-14 for treatment by the bioretention cell.

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Based on evaluation the information presented herein, it is our opinion that stormwater coming in contact with fecal matter and/or E. coli originating from normal Facility operations does not discharge directly to surface water, but rather is collected by stormwater management structures and delivered to the process water system for treatment by the Facility WWTP.

Cardno is pleased to be of service to Tyson Foods. If you have any questions or require additional information, please contact us at 804-798-6525 or at eric.powers@cardno.com.

Sincerely,

James L. Douglass CHS-III, P.G., P.E.
Senior Engineer
for Cardno
Direct Line +1 804 433 3537
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Eric R. Powers, C.P.G
Principal
for Cardno
Direct Line +1 804 336 0612
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Attachments: Figure 1, Water Management Site Plan
Figure 2, Water Management Site Plan Insets

COMMONWEALTH OF VIRGINIA
JAMES LLOYD DOUGLASS
Lic. No. 30484
06/10/15
PROFESSIONAL ENGINEER

LEGEND

- TOPOGRAPHIC CONTOUR (HANOVER COUNTY GIS)
- FACILITY BOUNDARY
- STORMWATER MANAGEMENT AREA
- DRAINAGE CHANNEL
- STORM PIPE
- SURFACE WATER FEATURE
- SURFACE/STORMWATER FLOW DIRECTION
- PROCESS WATER PIPE
- PROCESS WATER FLOW DIRECTION
- TRENCH DRAIN
- PROCESS WATER FEATURE
- DROP INLET

NOTES:

TOPGRAPHIC SOURCE:
http: //www.hanovercountygis.org/

PLANT INFORMATION: January 15, 2014 Facility Stormwater Pollution Prevention Plan; May 7, 2015 site visit.

STORMWATER MANAGEMENT AREAS: Sheet M2, Drainage Areas, Site Plan and Erosion & Sediment Control Plan, Reid Engineering circa 1992.

100' 0 100'

SCALE: 1" = 100'

COMMONWEALTH OF VIRGINIA
JAMES LLOYD DOUGLASS
Lic. No. 30484
06/10/15
PROFESSIONAL ENGINEER

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NO.	DATE	REVISION

DESIGNED:	JLD
DRAWN:	jld
CHECKED:	ERP
DATE:	06/10/2015
SCALE:	AS SHOWN
FILE NO.:	TF001_Site_Plan_final.dwg
PROJECT NO.:	TF001
OFFICE LOC.:	Ashland, VA, USA

Tyson Foods
Glen Allen Plant
Hanover County, Virginia

Water Management Site Plan

Figure
1

INSET 1: AREA 2

AREA 2 - LIVE RECEIVING/WET DOCK

DI-2

BMP-14

CURB

WW-3

PIT PUMP

DI-9

PRODUCT HANDLING AREAS

BMP-5 TRENCH DRAIN

OFFAL ROOM

COMMENTS:
1) Product is handled in areas where surface drainage is directed to BMP–15 (trench drain), Pit Pump and/or DI–9.

2) Trailer drippings and storm water are collected by these three BMP and directed toward process water pipes. Process water piping directs flow to WWTP.

3) Other Area 2 surface drainage is directed to either DI–2 or BMP–14. DI–2 connects to a process water pipe which discharges to the WWTP. BMP–14 is a bioretention cell, which provides treatment prior to discharge.

4) Pipe inverts are normally left open.

N

30' 0 30'

SCALE: 1" = 30'

LEGEND

- TOPOGRAPHIC CONTOUR (HANOVER COUNTY GIS)
- FACILITY BOUNDARY
- STORMWATER MANAGEMENT AREA
- DRAINAGE CHANNEL
- STORM PIPE
- SURFACE WATER FEATURE
- SURFACE/STORMWATER FLOW DIRECTION
- PROCESS WATER PIPE
- PROCESS WATER FLOW DIRECTION
- TRENCH DRAIN
- PROCESS WATER FEATURE
- DROP INLET

COMMONWEALTH OF VIRGINIA
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NOTES:

TOPGRAPHIC SOURCE:
http://www.hanovercountygis.org/

PLANT INFORMATION: January 15, 2014 Facility Stormwater Pollution Prevention Plan; May 7, 2015 site visit.

STORMWATER MANAGEMENT AREAS: Sheet M2, Drainage Areas, Site Plan and Erosion & Sediment Control Plan, Reid Engineering circa 1992.

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NO	DATE	REVISION

DESIGNED:	JLD
DRAWN:	jld
CHECKED:	ERP
DATE:	06/10/2015
SCALE:	AS SHOWN
FILE NO.:	TF001_Site_Plan_final.dwg
PROJECT NO.:	TF001
OFFICE LOC.:	Ashland, VA, USA

BMP-12 TRENCH DRAIN

AREA 7 - LIVE HOLDING SHED

DI-3

BMP-14

COMMENTS:
1) Trailers are parked on concrete pad that is double–sloped toward central trench drain (BMP–12).

2) BMP–12 catches trailer drippings, which drain to process water pipe at east end of pad. Process water pipe directs flow to WWTP.

3) Pipe invert is normally left open.

4) BMP–12 is under roof so storm water does not enter process water flow.

INSET 2: LIVE HOLDING SHED

BMP-14 (CONCRETE DRAIN PAD W/ PIPE INVERT)

COMMENTS:
1) Trailers are parked on paved surface sloped toward concrete drain pad (BMP–14).

2) BMP–14 catches trailer drippings and stormwater, which drain to process water pipe at east end of pad. Process water pipe directs flow to WWTP

3) Pipe invert is normally left open.

INSET 3: REMOTE TRAILER PARKING AREA

Tyson Foods
Glen Allen Plant
Hanover County, Virginia

Water Management Site Plan

Figure
2

Attachment K: Storm Water Data (Outfall 002)

Stormwater Data Outfall 002

Outfall 002	Flow		pH		BOD5	TSS	Fecal Coliform	TP	NH_3	TKN	Oil&Grease
	(MGD)		(SU)		(mg/L)	(mg/L)	(#/100ml)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Due Date	**AVG**	**MAX**	**MIN**	**MAX**	**MAX**	**MAX**	**MAX**	**MAX**	**MAX**	**MAX**	**MAX**
10-Jun-10	0.809	0.809	6.8	6.8	<QL	4.5	1600	0.19	2	1.28	<QL
10-Jul-10	0.792	0.792	7.3	7.3	<QL	2.9	300	<QL	<.5	<QL	<QL
10-Jan-11	1.367	1.367	7.0	7.0	<QL	12.2	1600	0.55	1.04	4.3	<QL
10-Oct-12	0.49	0.697	7.2	7.2	<QL	4.6	500	0.14	0.19	1.04	7.5
10-Apr-12	0.687	1.34	7.0	7.0	5.2	25.8	1600	0.48	0.58	2.29	<5
10-Dec-12	0.49	0.697	7.2	7.2	<QL	4.6	500	0.14	0.19	1.04	7.5
10-Jun-13	0.49	0.697	7.2	7.2	<QL	4.6	500	0.14	0.19	1.04	7.5
10-Dec-13	0.725	1.976	6.7	6.7	18.9	228	1600	0.48	0.46	2.45	<QL
10-Jun-14	1.005	1.005	7.0	7.0	11.4	99.2	1600	0.72	0.68	4.71	<QL
10-Dec-14	0.881	0.881	7.2	7.2	9.1	213	1600	1.09	0.41	1.37	<QL
AVG	***0.774***	***1.026***	***7.06***	***7.1***	***11.2***	***59.9***	***1140***	***0.44***	***0.64***	***2.2***	***7.5***
90th percentile	***1.04***	***1.43***	***7.21***	***7.21***	***16.7***	***215***	***1600***	***0.79***	***1.23***	***4.38***	***7.5***
10th percentile	***0.49***	***0.70***	***6.79***	***6.79***	***6.37***	***4.34***	***480***	***0.14***	***0.19***	***1.04***	***7.50***

EPA ID Number (*copy from Item 1 of Form 1*)
VA0004031

Form Approved. OMB No. 2040-0086
Approval expires 5-31-92

VII. Discharge information *(Continued from page 3 of Form 2F)*

Part A – You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Oil and Grease	4 MG/L	N/A	1.76 MG/L	N/A	5	
Biological Oxygen Demand (BOD5)	8.8 MG/L	N/A	3.18 MG/L	N/A	5	
Chemical Oxygen Demand (COD)	88 MG/L	N/A	83 MG/L	N/A	3	
Total Suspended Solids (TSS)	20.67 MG/L	N/A	6.17 MG/L	N/A	5	
Total Nitrogen	39.70 MG/L	N/A	26.57 MG/L	N/A	4	
Total Phosphorus	.187 MG/L	N/A	.097 MG/L	N/A	5	
pH	Minimum	Maximum	Minimum	Maximum		

Part B – List each pollutant that is limited in an effluent guideline which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). Complete one table for each outfall. See the instructions for additional details and requirements.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
BOD5	8.8 MG/L	N/A	3.18 MG/L	N/A	5	
TSS	20.67 MG/L	N/A	6.17 MG/L	N/A	5	
Chlorine, res.	<QL U/GL	N/A	<QL U/GL	N/A	5	
Total Phosph	.187 MG/L	N/A	.097 MG/L	N/A	5	
Fecal Colif	1600 N/CML	N/A	1120 N/CML	N/A	5	
oil & Grease	4 MG/L	N/A	1.76 MG/L	N/A	5	
TKN	1.28 MG/L	N/A	1.09 MG/L	N/A	5	
pH	7.6 SU	N/A	7.07 SU	N/A	5	
D.O	6.31 MG/L	N/A	6.03 MG/L	N/A	4	

Attachment L: Monitoring Frequencies Reductions Calculations

Monitoring Frequency Reductions Analysis - Outfall 001

Outfall 001 DMR Due Date	BOD_5 (mg/L) MO AVG	TSS (mg/L) MO AVG	Fecal Coliform (MPN/100ml) DAILY MAX	TP (mg/L) MO AVG	TN (mg/L) MO AVG	Ammonia (mg/L) MO AVG	Settleable Solids (ml/L) MO AVG	Zinc, Total (µg/L) MO AVG	*E. coli* Geometric Mean (n/100 ml) MO AVG	O&G (mg/L) MO AVG	DO (mg/L) MIN	pH (SU) MIN	pH (SU) MAX
10-Jan-12	1.1	2.3	5.67	0.21	6.12	0.2	<QL	6.33	5.33	<QL	8.17	5.17	7.5
10-Feb-12	2.22	2.1	87.5	0.14	7.09	<QL	<QL	<QL	<QL	1.53	6.26	6.03	7.4
10-Mar-12	1.21	1.78	34	0.22	5.932	0.053	<QL	<QL	1	1.42	8.61	6.57	7.17
10-Apr-12	1.94	1.95	2	0.23	6.38	0.04	<QL	<QL	3	<QL	8.05	6.13	7.11
10-May-12	0.41	1.34	2	0.08	8.14	0.03	<QL	<QL	2	<QL	8.04	6.03	7.4
10-Jun-12	0.86	1.32	<QL	0.08	7.4	0.03	<QL	<QL	33	<QL	7.73	6.54	7.19
10-Jul-12	0.65	1.34	2	0.17	7.79	0.04	<QL	<QL	0.25	2.85	7.79	6.98	7.39
10-Aug-12	0.93	1.6	<QL	0.2	7.23	0.02	<QL	<QL	1	2.03	7.21	6.43	7.54
10-Sep-12	<QL	2.19	<QL	0.21	5.57	0.02	<QL	<QL	0.4	1.42	6.74	7.01	7.62
10-Oct-12	<QL	1.98	<QL	0.24	6.02	<QL	<QL	<QL	<QL	<QL	6.69	7.1	7.63
10-Nov-12	<QL	1.32	<QL	0.2	9.65	<QL	<QL	<QL	0.4	1.08	7.03	6.48	7.68
10-Dec-12	1.82	3.31	<QL	0.12	7.46	<QL	<QL	<QL	<QL	1.58	7.29	6.64	7.1
10-Jan-13	0.47	1.68	22	0.07	10.23	<QL	<QL	36	<QL	<QL	5.25	6.52	7.17
10-Feb-13	<QL	1.69	<QL	0.13	9.64	0.72	<QL	32.1	<QL	<QL	6.53	6.74	7.5
10-Mar-13	<QL	1.48	<QL	0.23	9.55	0.35	<QL	33.8	<QL	<QL	9.25	6.43	7.14
10-Apr-13	<QL	46.92	<QL	0.22	8.58	0.1	<QL	35.6	<QL	<QL	8.71	6.5	7.28
10-May-13	<QL	1.93	<QL	0.15	6.98	0.1	<QL	49.2	<QL	<QL	8.04	6.39	7.08
10-Jun-13	0.25	0.43	<QL	0.08	9.28	0.01	<QL	<QL	<QL	<QL	7.16	6.19	6.93
10-Jul-13	0.82	1.78	<QL	0.15	8.05	0.01	<QL	27.7	<QL	<QL	7.71	6.12	7.01
10-Aug-13	0.17	0.43	<QL	0.1	7.53	0.01	<QL	42.7	55.4	<QL	7.48	6.29	6.91
10-Sep-13	<QL	1	30	0.13	5.41	0.04	<QL	15.8	4	<QL	7.74	6.55	6.91
10-Oct-13	<QL	0.78	4	0.11	2.5	0.03	<QL	10	0.25	<QL	7.22	6.5	7.3
10-Nov-13	0.19	1.29	2	0.09	7.41	<QL	<QL	17.2	<QL	<QL	8.77	6.45	7.4
10-Dec-13	<QL	3.48	<QL	0.18	6.58	0.03	<QL	15.5	0.25	1.73	7.31	6.48	7.51
10-Jan-14													
10-Feb-14													
10-Mar-14													
10-Apr-14													
10-May-14	3.18	2.5	<QL	0.16	11.81	0.05	<QL	45.4	<QL	<QL	8.45	6.53	7.06
10-Jun-14	2.16	1.81	<QL	0.13	9.28	<QL	<QL	16.1	<QL	<QL	8.18	6.28	7.62
10-Jul-14	0.53	0.79	<QL	0.11	10.57	0.01	<QL	15.7	1	1.68	7.34	6.51	6.89
10-Aug-14	1.06	3.53	<QL	0.15	19.36	0.02	<QL	11.4	<QL	<QL	6.4	6.41	6.94
10-Sep-14	0.21	2.88	<QL	0.1	4.53	<QL	<QL	29	<QL	<QL	7.73	6.47	7.24
10-Oct-14	<QL	1.31	<QL	0.07	2.22	<QL	<QL	13.7	<QL	<QL	6.73	6.61	7.06
10-Nov-14	0.14	0.95	<QL	0.07	2.67	<QL	<QL	13	<QL	<QL	7.98	6.68	7.31
10-Dec-14	0.75	1.83	<QL	0.08	4.8	<QL	<QL	22.65	19.44	<QL	8.72	6.76	7.43
Permit Limit	6.0	5.0	400	0.3	103	2.0	0.1	190	126	8.0	5.0	6.0	9.0
AVERAGE	1.00	3.16	19.12	0.14	7.56	0.09	0.00	24.44	8.45	1.70	7.57	** see note below	
Percentage of Limit	16.72	63.14	4.78	48.02	7.34	4.55	NA	12.87	6.70	21.28	48.56		
Baseline Monitoring Freq.	1/Week	1/Week	1/Month	1/Month	1/Month	1/Week	1/Week	1/Month	1/Week»	1/Week	1/Day	1/Day	1/Day
2015 Proposed Freq.	1/ Month^	1/Week	1/ 6 months	1/ 3 Months	1/Month***	1/ 2 Months	1/Month∞	1/ 6 Months	1/Week	1/ 2 months	3/Week~	1/Day	1/Day

The DMR data from January - April 2015 has been omitted from this evaluation. During the time the plant experienced an upset due to the presence of freshwater snails in the treatment plant in large numbers. DEQ agreed to disregard the effluent data reported during this period for the purpose of the reduced monitoring evaluation due to the extraordinary circumstance.

^ Based on performance, BOD monitoring frequency would be eligible to a reduction of 1 / 2 Months. However, because BOD is an operational parameter, monitoring frequency is reduced to 1/Month based on PWJ.

*** TN year-to-date applied per GM 07-2008 Amendment 2. Reduced frequency not available

** Reduced monitoring for pH considered on a case by case basis. Per the 2014 VPDES permit manual, reduced monitoring of pH is not granted where min or max pHs fall within 0.5 units of the permit limits. Throughout the last three years the minimum pH has fallen within 0.5 units of the 6.00 SU limit (highlighted in red) on many occasions. For this reason a reduction in the monitoring frequency for pH is not recommended.

» E. coli monitoring frequency will remain at 1/Week due to UV disinfection system replacing chlorination in 2010. Frequency in accordance with section IN-2 of 2014 VPDES permit manual

∞ Reduced monitoring frequency for settleable solids is based on permit writer judgment due to all results being reported as <QL.

~ Reduced monitoring frequency for DO eligible on PWJ as the facility does not provide active aeration; formula applied for reduced frequency as follows: (1-((DO avg - DO limit)/DO limit)*100

Attachment M: Owner Comments and DEQ Response to Comments

Summary of Owner Comments and DEQ Response to Comments – Conference Call July 2015

Document/ Page	Language	Comment	DEQ Responses
Stormwater	Bacteria monitoring.	How is the engineering study insufficient?	The engineering study states that in Area 7 "stormwater is directed toward BMP-14 where it is treated prior to discharge to surface water. BMP-14 was constructed to manage potential incidental contact with fecal residue that might occur as delivery trucks are moved through the area." Consequently, there is potential for bacteria contributions to stormwater from the facility operations. A reduced monitoring frequency of 1/6 months will be assigned in recognition of minimal potential for contact. If bacteria concentrations in excess of the benchmark are measured, updates to the SWPPP may address source isolation sampling and existing BMPs in place to minimize potential for contact with the industrial operation.
Fact sheet page 6 of 25	"As was the case during the 2010 evaluation, statistical evaluation of both species test end points resulted in limitation recommendations based on chronic toxicity." Guidance Memo 00-2012, data evaluation, and permit writer judgment.	We need to better understand the rationale for the new WET limitations	As promised, I verified with Deborah DeBiasi that a limitation is appropriate for the reissuance. Additional data was provided by Tim Lockhart and used in the evaluation. Consequently, the limitation has been revised from 1.38 TUc to 1.12 TUc. As indicated in the permit, we are providing a 4 year schedule of compliance to allow for the operational and potential capital upgrades needed. While we discussed the option for Tyson to request a modification prior to the close of the compliance schedule in order to remove the limitation, in the absence of a conclusive argument that the existing data is no longer representative, the need for a limitation is not likely to change.
Permit Section I, Table	720 – Toxicity	We need to better understand the rationale for the toxicity limitation expressed.	As explained, the toxicity limitation is based on reasonable potential for the effluent to cause toxicity to aquatic life. Because in stream mixing is not available, any toxicity observed in the effluent triggers the need for a limitation. Toxicity was observed in 4 separate sampling events.
Fact Sheet Page 8 of 25	Hydrogen Sulfide – Annual monitoring only	Sampling is not warranted or required. Results submitted March 15, 2015, show non-detect concentrations for total sulfide.	We have received documentation of sample collection errors for the initial results indicating the presence of H2S. Consequently, we have omitted the data and further sampling under the permit is not required.
VPDES Permit, p. 22 of 24, 15 and Sec. D	Hydrogen Sulfides Minimization Plan	Need to understand the rationale for inclusion.	In accordance with the response above, this condition has been removed.

Summary of Owner Comments and DEQ Response to Comments – Conference Call July 2015

Fact Sheet Page 6 of 25, Permit Part I(D)?	145 – Chlorides	Need to understand the rationale for inclusion of testing based on the worksheet model for toxicity.	While the reasonable potential analysis triggers a limitation, DEQ recognizes that a limitation may not be necessary with a larger data set. The existing data is well below the WLA. Consequently, monthly monitoring will be required over the course of the permit term and reasonable potential will be evaluated at the next reissuance.
VPDES Permit, Part I	002 – pH 1/day 007 – DO 1/day	Why are these not 1/week as with similar analytes (see 004 TSS)	These are operational parameters and it is standard practice to require a baseline of 1/day monitoring frequency.
VPDES Permit, p. 22 of 24, Sec. D	Schedule of Compliance for Chlorides and WET	Need to understand the rationale for inclusion.	Chlorides will be removed from the Compliance Schedule. The schedule will be retained for the WET limitation to allow the facility time to make any operational changes or capital upgrades needed to comply with the limitation.
	012 – TP limits 794 – TP limits	Need rationale for expressions of TP as written	As explained during the conference call, and further in the FS, each of the TP limits is required by regulation. Although the loading limitation in the IP is equal to the Nutrient Trading GP loading, the GP is not protective of the Chickahominy TMDL, on which the IP limitation is based. Because the Nutrient GP allows for trading, a firm limitation is included in the IP to protect the Chickahominy TMDL.
	071 – Settleable Solids	This plant has a tertiary filter and the limitation should be removed or at least reduced to quarterly.	As discussed, the monitoring frequency has been adjusted to once per month for Settleable Solids.
VPDES Permit, Part I, Sec. 7	Compliance Reporting	Verify that if the level is below QL, then report a zero or "QL." *See* page 20, 7(c).	As stated in the permit, "All concentration data below the QL used for the analysis… shall be treated as zero."
VPDES Permit, Part I, Sec. 13	Effluent Monitoring Frequencies	Baseline monitoring with no reversion possible for permit term?	This is a standard condition that is applied consistently when the privilege of reduced monitoring is granted in the permit. The condition requires that if an NOV is issued for any of the parameters, all monitoring frequencies revert to baseline until the evaluation is conducted again at permit reissuance. At your request, we have revisited the baseline frequencies and made adjustments consistent with previous permits.
		Define "grab" or "in situ" samples	Michael Terry coordinated with the Compliance Manager in the Piedmont Regional Office and she resolved his concerns. Grab samples will be required in the permit
Fact Sheet, Page 6 of 25	Zinc	Need to understand the rationale for inclusion.	Reasonable potential was demonstrated in the evaluation presented in the FS.

Summary of Owner Comments and DEQ Response to Comments – Conference Call July 2015

Fact Sheet, Page 8 of 25	Chlorine (TRC)	No chlorine on site.	While chlorine is not used as a disinfection method at the facility, a TRC special condition is included to allow for emergency needs for chlorine disinfection. The condition has been revised to remove the TRC residual requirements within the contact tank.
Fact Sheet, Page 8 of 25	Design Flow	1.07 MGD design flow vs. 1.25 MGD	This reference has been removed from the FS.

Tyson Foods, Inc.

July 20, 2015

Ms. Emilee Adamson
Virginia Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, Virginia 23060

Re: Requested information from the subject facility:
Tyson Glen Allen Plant
VPDES Permit No. VA0004031

Dear Ms. Adamson,

Tyson greatly appreciates your time and consideration during pre-draft reviews of the above referenced permit. Following the conference call on July 20, 2015 please accept the following information in response to inquiries concerning 1) name change on Permit, 2) rationale to exclude Hydrogen Sulfide as a permit parameter, and 3) rationale to reduced monitoring for Dissolved Oxygen.

1) **Owner Name:**
The official owner & facility name is: Tyson Farms, Inc.

2) **Elimination of Hydrogen Sulfide as permit reissuance parameter:**
As was discussed on the conference call, the 2010 sample submission was collected at the wastewater facility employees not familiar with protocols associated with sampling for such sensitive parameters. Tyson requested DEQ to allow for additional samples to be performed by qualified 3rd party agents. The result of the additional testing indicated non-detection of any dissolved hydrogen sulfide. In addition, the current wastewater process, chemical program, waste activated sludge handling, equipment and management thereof has changed significantly since 2010.

3) **Reduced Dissolved Oxygen monitoring:**
The decision to not allow a reduced dissolved oxygen monitoring schedule may have been based on the presence of a non - passive post aeration system listed in the DEQ's documentation. This was the case in June 2010 at the time of the permit application submittal, however in December 2010 the installation of the UV disinfection system was completed along with other system changes eliminating the need and use of non-passive post aeration system.

If you have any questions or require additional information please contact me at 798.8357 ext 305 or at tim.lockhart@tyson.com

Sincerely,
TYSON FOODS, INC.

Tim Lockhart
Environmental, Health & Safety Mgr.

COMMONWEALTH of VIRGINIA

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PIEDMONT REGIONAL OFFICE
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Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Michael P. Murphy
Regional Director

June 29, 2015

Mr. Dale Mullen
McGuire Woods LLP
901 East Cary Street
Richmond, VA 23219-4030

Re: Tyson Farms, Inc. Glen Allen Plant Draft Permit # VA0004031

Dear Mr. Mullen,

The Department of Environmental Quality (the Department) has received your letter dated April 22, 2015 and the subsequent engineering analysis received June 19, 2015, for the subject facility, and provides the following comments:

1. As discussed during the October 1, 2015 meeting with the facility, Department staff has performed a monitoring frequency reduction analysis for all parameters. Please see Attachment L of the fact sheet for the calculations of the final monitoring frequencies that will be included in the Permit, and the respective rationales. Please note that data reported in the DMRs from January to April, 2014 were not included in the analysis following explanation that the facility had experienced an upset due to the presence of freshwater snails in the treatment plant.

2. The Department has reevaluated the monitoring requirements for *E.coli* at Outfall 001. With a baseline monitoring frequency of 5 days per week, as recommended by GM14-2003 for a plant with a design capacity of 1.25 MGD and a maximum 30-day average flow of 1.0 MGD, the Department has calculated a monitoring frequency of 1 per week for the 2015 permit.

3. The additional two sampling data provided in the March 25, 2015 report were incorporated in the Reasonable Potential Analyses (RPA) for cadmium, selenium, zinc, and chloride. The analyses results show that no limitation is required for cadmium, selenium and zinc. The RPA for chloride shows the need for a limitation based on chronic toxicity. Because this is a new limitation, a four-year schedule of compliance will be included in the permit. Despite the RPA for zinc showed no limitations needed for zinc, the 2005 limitation will be carried forward to the 2015 permit to avoid non compliance with antibacksliding regulation.

4. The Department is willing to eliminate the hydrogen sulfide special condition from the draft permit. However, annual monitoring for dissolved sulfide will be required in the permit unless the permittee can provide a justification of why the initial concentration of 400 ug/L is no longer representative of the effluent. Please note that any further monitoring would be required in the permit and will not be allowed prior to reissuance.

5. The permittee expressed concern that the TMP Data Evaluation dated December 1, 2010, from which the new chronic toxicity limit was derived, was out of date and utilized data that was no longer representative of the facility's effluent quality. DEQ agreed to rerun the statistical analysis on the toxicity data using more recent data. All data that was available from 2009 to present was compiled and utilized for the updated evaluation. As was the case during the 2010 evaluation, statistical evaluation of both species test end points resulted in limitation recommendations based on chronic toxicity. In accordance with Guidance Memo 00-2012, data evaluation, and permit writer judgment, it was determined that: 1) the facility continue conducting quarterly chronic toxicity tests (Chronic 3-Brood Static Renewal Survival and Reproduction Test using *C. dubia* until the WET limit is effective and 2) a new WET limitation of NOEC = 72% and TUC = 1.38 be established for *C. dubia* with a 4 year compliance schedule. Also please note that because the facility has to comply with a WET limit, monitoring frequency reduction is not allowed, and therefore no language for frequency reduction will be included in the permit.

6. The Department believes that the concentration units for total nitrogen and total phosphorus as reported in Part I.A of the draft permit are consistent with the reporting requirements. The daily maximum units for total phosphorus and total nitrogen are expressed in kg/year versus kg/day because the facility has Total Nitrogen and Total Phosphorus calendar year load limits associated with Outfall 001 as included in the 2012 Registration List, under registration number VAN040089 (see footnote 9 in Part I.A of the permit). The calendar year load limit for total phosphorus in the permit has been converted from lbs/year to kg/year. Please refer to special conditions I.C.12 and I.C.13 for nutrients reporting requirements. While it may seem confusing initially, the inclusion of several different nutrient reporting parameters (i.e. annual average, year-to-date average, etc.) is necessary to meet the regulatory requirements of 9VAC25-40-70 and 9VAC25-31-220.L. This presentation is consistent in all permits discharging to the Chesapeake Bay.

7. The Department has reviewed the Stormwater Flow Evaluation Report dated June 10, 2015, and provides the following comments:

    a. Figure 1 shows the presence of a basin named BMP-4. Please provide a description of the functionality of the basin in relation to the stormwater flows that it receives from the several SWM areas on site, and in relation to the bioretention cell BMP-14.

    b. Based on the report and maps provided, it is unclear where the treated process wastewater and the stormwater flow collected by the drainage channel are discharged. Our records indicate that the point of compliance for Outfall 002 (stormwater) is prior to the point at which the wastewater treatment plant effluent and the stormwater mix. Hence, the stormwater samples are not comingled with treated process wastewaters. Please provide a description and the locations of the points of discharge for both Outfall 001 and 002.

    c. The stormwater report mentions that the stormwater runoff comes in contact with unprocessed product in only two drainage areas (area 2 and area 7), and that in both cases stormwater is treated, by the wastewater treatment plant (area 2) or bioretention cell (BMP-14, area 7) prior to being piped to the WWTP. However, the report also mentions that part of the stormwater that is directed to BMP-14 is then directly discharged to surface waters. In addition, the Department has some reservations with respect to the conclusion that only area 2 and area 7 have the potential of direct contact with bacteria; specifically, it appears that area 5, described as a service center with fueling and washing activities, may have the potential to carry bacteria.

        Unless the permittee is able to demonstrate that: 1) no stormwater runoff that has been in contact with unprocessed product or incidental chicken waste from transport activities is directly discharged to surface waters; 2) the washing and rinsing activities in area 5 do not have the potential for stormwater to come in contact with livestock bacteria; the

Department believes that continued monitoring for *E. Coli* in the stormwater at Outfall 002 is appropriate.

Given the limited potential for contact with bacteria from the process activities, we are willing to reduce the bacteria monitoring from once per quarter to semiannual.

Please provide a response to the comments above within 14 days of receipt of this letter. Should you have any questions regarding any of the comments above, please contact me at 804-527-5095, or laura.galli@deq.virginia.gov.

Sincerely,

Laura Galli
VPDES Permit Writer

Enclosures: revised permit, fact sheet, and fact sheet attachments
Cc: Tim Lockhart – Tyson Foods

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April 22, 2015

Laura Galli
VPDES Permit Writer
Virginia Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060

Re: Tyson Farms, Inc. Glen Allen Plant Draft Permit # VA0004031

Dear Laura:

In response to your email of April 2, 2015, we offer the following details regarding the draft permit, similar to the conversations we had at our October meeting.

DEQ has indicated a willingness to evaluate the monitoring frequency requirements for a number of parameters. These generally fall into two categories. The first are parameters where the monitoring frequency was based, in part, on data collected during upset conditions at the plant due to the presence of freshwater snails. This includes TSS and BOD which had elevated levels during the upset, which ran from approximately January 2014 through April 2014.

The second category was parameters which had an extremely limited number of samples, some of which included limits of detection that were too high for the parameter. In support of lowering the sampling, or eliminating the limit altogether, we submitted the additional data you received a few weeks ago for total sulfides, chlorides, selenium, cadmium and zinc.

Tyson also feels that the Hydrogen Sulfide Minimization Plan in the current draft is unnecessary. The recent data provided to DEQ reflects no detectable levels of total sulfides in the plant's wastewater. However, if the Department feels it is necessary, Tyson can conduct additional analyses specific to Hydrogen Sulfide to support removal of this permit condition.

As noted previously, we would like to reduce or eliminate the monitoring requirement for E. coli and fecal coliform at Outfall 2. The current data at the storm water outfall show fecal coliform above the screening value of 28 N/cmL, with results ranging up to 1,600 N/cmL. It is our opinion that the source of the fecal coliform is natural given the wildlife present in the stormwater retention pond and outfall stream. Our basis for this is that (1) there is no indication of significant levels of fecal coliform or E. coli in the process water at Outfall 1, and (2) there is no other potential source of these contaminants on site. We will support this through an engineering review of plant operations. The storm water drainage map (Attachment J to the Fact Sheet) shows that 40% of the plant area, including all of the parking surfaces where birds

are temporarily stored before being processed, drain not to the stormwater outfall, but instead are captured and fed into the wastewater treatment system on site. Thus, the engineering review will show that any fecal coliform or E. coli present at the stormwater outfall are the result of wildlife at the rural facility. Given this, Tyson does not feel that the monitoring requirements at Outfall 2 are necessary or appropriate. We expect that engineering analysis will be available for submission to the Department not later than Friday, May 8, 2015.

We would also like to reduce the monitoring requirements for E. coli at Outfall 1. The current increased frequency for monitoring based on the conversion to UV disinfection appears to be overly burdensome. The frequency appears to be based, in part, on the design flow of the plant, which is roughly 1.25 MGD. However, average flows at the plant are significantly lower, running at roughly 0.7-0.75 MGD on average. In addition, several systems are in place to ensure that the UV system provides the necessary disinfection, including a back-up bank of UV lights, and mandatory shut-down of operations should the UV system fail.

The current draft permit also includes additional chlorine limitations. While Tyson does not object to having the limits, should use of chlorine for disinfection on an emergency basis be necessary, we would request a slight change to the wording in this section to clarify that it would only apply during such intermittent use. The first sentence should read "If chlorine is used as a disinfection method (instead of ultraviolet), TRC shall be limited and monitored by the permittee as specified below from the time of initial utilization and continued until termination of use plus 7 days:"

Tyson also questions the necessity of the new requirement for toxicity testing in the draft permit. Our evaluation of the WET testing data shows that a single outlier data point from January of 2007 may be driving this requirement. Tyson believes that evaluation of the newer WET testing data from 2009 to present will show that the data from January 2007 is an outlier as all more recent testing showed 100% survival and good reproduction. In addition, Tyson would like to discuss the possibility of future reductions in WET testing frequency should the data continue to show little to no toxicity. For instance, Tyson has provisions in similar permits which reduce WET testing to an annual basis if four straight quarters show no lethal or sub-lethal effects.

Tyson also asks that DEQ utilize simplified (consistent units) limits for Nitrogen and Phosphorus in the revised permit. The draft permit includes multiple expressions of permit limits for these parameters, which may result in confusion when determining the appropriate sampling times and reporting of results.

This is merely a summary of the issues we have identified to date. We would like to reserve the opportunity to review and comment on subsequent draft documents before a subsequent draft is issued for public notice, we ask that we be allowed to discuss these points with you at an early opportunity. We expect that engineering analysis regarding stormwater, and additional WET testing will be available for submission to the Department not later than Friday, May 8, 2015.

I can be reached at 804.775.1101 (Direct), or my partner Dale Mullen can be reached at 804.775.4710 (Direct).

Sincerely,

Darin K. Waylett

CC: Kyle Winter
Dale Mullen
Timothy Jones
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